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Sensory ecologies and semiotic assemblages during British Sign Language interpreted weather forecasts

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Abstract

We present a study examining broadcast British Sign Language (BSL) interpreted weather forecasts. These are filmed against a green screen with a superimposed composite image broadcast including maps and satellite information, etc. that can be indexed. We examine the semiotic resources used when interacting with the available visible on-screen information to the viewing audiences. The forecasters and interpreters tailor their multimodal communicative practice to the sensory ecology (Kusters, 2017) of the audiences they serve. That is to say that, speakers/hearers hear the spoken monolingual linguistic resources while seeing the gestural resources of the forecaster; BSL signers/watchers view the multilingual linguistic resources (both categorical and gradient) and co-sign gestural resources, subsequently watching the gestural resources of the forecaster and the interpreter-presenter. We identify that while similar gestural resources are used by the weather presenters and the in-vision interpreter-presenters, the temporal alignment of the semiotic assemblages (Pennycook & Otsuji, 2017) of linguistic and gestural resources are different. The assumed normative practices of the deaf audience appear to significantly contribute to the consecutive use of semiotic resources that we see presented in BSL by in-vision interpreter-presenters. In addition to simultaneous assemblages, favoured by the weather forecaster presenters, they also create consecutive semiotic assemblages.

Introduction

Typically, interactions that are analysed involve people talking to each other and engaging in communicative activity as a cooperative activity (Bagga-Gupta, 2017; Clark, 1996; Gynne & Bagga-Gupta, 2013). In this study, however, we explore a communicative activity with a non-present audience that is imagined as a 'pragmatic other' (Vuorinen, 1997). For this study we will be examining broadcast television in the UK, specifically the in-vision British Sign Language rendering of the weather forecast during breakfast news broadcasts.

Before we consider the specific context that this analysis will explore, we will first describe the position of the authors on language and the notion of semiotic assemblages. We will then describe the history of weather forecast presenting on television, and the history of weather forecast presenting with British Sign Language (BSL) in-vision interpreter presenters. Finally, we will discuss data collection and then present our analysis of both weather forecaster presenter assemblages and in-vision interpreter presenter assemblages of weather forecasts before moving onto the discussion of the data.

Languaging and semiosis

As noted in Kusters et al (2017), sign language *signers* draw upon a variety of semiotic resources when using language-in-action or languaging (Bagga-Gupta 2017). These sign language resources include canonical lexical items comprised of discrete phonological elements to make well-formed lexemes (including parameters such as handshape, place of articulation, internal movements, external movements) of named sign languages. Languaging also includes elements which are gradient such as locations within a signing space, i.e. the cubic space within which signs are produced (from the waist to the top of the head, slightly wider than shoulder width, as deep as a partially stretched arm).

Sometimes these discrete and gradient elements can co-occur whereby a discrete-categorical phonological form (e.g. an upright index finger) is placed in signing space as a mimetic form to represent an upright human (typically). This discrete form can then be moved within the signing space in a gradient-analogue manner to represent the path that a human took moving through a space.

These depicting forms (Dudis, 2004) fuse or co-articulate discrete-categorical and gradient-analogue elements combining these two types of linguistic resources to create a form that communicates a complex meaning without using multiple lexemes to construct that meaning. We can see this kind of fusion of discrete and gradient elements in both signed and spoken languages. But what appears to be ‘unique about signed languages is the schematic and isomorphic mapping between linguistic and cognitive representations of space’ (Emmorey & Herzig, 2003, p. 234). That is to say that the space used to articulate discrete lexemes is also the space that can be used as a gradient semiotic resource to depict elements of real-world space (and metaphoric space although this is less relevant for our analysis here).

Similarly there are lexemes that are discrete phonological forms for size, e.g. a small flat circular object or ‘coin’ (representing the two dimensional form of a coin by creating a circle with thumb and index finger), medium ‘coin’ (partially open circle with distal phalanges bent), and larger ‘coin’ (fully open circle with distal phalanges bent). As discussed in Fuks (2014, p. 209), we would agree that ‘the gradual iconic modifications overlaid upon handshapes are analogous to the prosodic gestures such as vowel lengthening (“it happened a loooong time ago”) overlaid upon discrete linguistic units during speech’. And that language is both multimodal in nature and comprised of both categorical and gradient elements which are systematically used as linguistic and semiotic resources.

The data we will draw upon is that of the presentation of weather forecasts, where an emergent property of the languaging of the presentation of the forecast is the interaction

between the forecaster, their spoken words, their deictic gestures, and the interaction of those words and gestures with the artefacts, i.e. maps, satellite pictures, etc. Pennycook's (2017) notion of semiotic assemblage draws our attention to "the dynamic relations among objects, places and linguistic resources" (p. 11). Thus the simultaneous articulation of these resources by the presenters intend to communicate a composite signal, or assemblage (Pennycook and Otsuji 2017), that is understood by their intended audience.

By also examining what sign language signers do in this context, it helps us "to move away from the sedimented terminology of bilingualism and code-mixing towards a more flexible account of how people deploy different linguistic resources" (Pennycook, 2016, p. 450) within this broadcast languaging practice. Furthermore, in addition to linguistic resources, conceptualising these as semiotic assemblages, enables us to consider how different semiotic resources are deployed within this specific material context. As an emergent property, we will also consider the simultaneous or consecutive timing of the deployment of each of the semiotic resources used by spoken language weather presenters and their in-vision interpreter weather re-presenting counterparts, which we will now describe.

Television Weather presenting

Weather presenting has a long history in the UK, with the first weather broadcast happening in 1923 when, at the time, the viewing public were typically naïve to the presentation of the weather and meteorological information. As with all television (Merminod & Burger, 2020), weather is a multimodal construction of scientific notions of weather rather than the lived experience of getting wet or getting sunburnt (Feuer, 1987). When reported in the Times (Nuttall 1993), we see that the picture alongside the article shows how for many years weather maps have been used to present weather forecasts. Specific symbols are used to show

weather phenomena, often drawing upon meteorological methods such as isobars to indicate pressure, or stylised symbols of clouds and rain to indicate on a map where some weather features are predicted to occur.

In more recent years we are seeing greater use of satellite data, and pictures are superimposed on maps to indicate where clouds, precipitation, or weather fronts are currently being experienced and predicted to happen. Even though the audience are not meteorological scientists, some of the languaging practices draw upon this specialist repertoire to communicate the weather; the weather presenters are themselves professional meteorologists (BBC 2016).

Historically these weather maps would have been physically present in studios, for the viewing audience to see, and for the weather forecaster to use. Symbols would have been stuck onto the weather maps directly with the viewer seeing the placement of these symbols co-occurring with spoken words and further gestures co-articulated with this spoken lexicon. The languaging present would be a fusion of categorical/discrete lexical items, and gradient/analogue gestures to create a weather forecast semiotic assemblage for the viewing public.

Over the last century the viewing public has become familiar with weather forecast semiotic assemblages. As technology has advanced, the shape of the tools or symbols has changed, and the types of tool use and lexical-gestural assemblages have changed too. As the semiotic assemblage is an emergent property of the interaction between all of these resources, this change is unsurprising. The presentation of weather forecasts is now well known in the UK (and of course globally), with the use of a variety of semiotic resources co-presented on the screen and indexed by the weather forecasters to facilitate a successful communicative event. In many ways this is an example of the idea of distributed language that Pennycook

(2016, 2017) discusses, in that the language is embodied, embedded within television broadcasts, and distributed across people, places and time by the act of broadcasting.

Currently, weather forecasters present in the television studio in front of a green screen background; they are superimposed on the broadcast image (using a technology often known as chromakey) with this composite broadcast image being seen by the viewing public. The semiotic assemblages that we see as viewers are therefore something prepared for broadcast. This composite or chromakey broadcast image is only seen by the weather presenters when they look at the superimposed image of themselves on a monitor in the studio, even though the broadcast image is the only thing the viewers see.

BSL in-vision provision

In the UK there has been a comparatively long history of programs created for BSL-signers specifically, such as the magazine program *See Hear* and its predecessors (Ladd, 2007). And there is a long history of programs with access for BSL-signers via in-vision interpreting or translation, dating back to the 1950s, more recently mandated by the Broadcasting Act 1990 and subsequent legislation (Ofcom, 2017). From January 2018, the weekend news broadcasts from 0700 – 0730 began to be rendered by deaf professionals; prior to that date national news was only presented by non-deaf profession interpreters working as in-vision BSL interpreters. The inclusion of deaf professions (already with experience of rendering pre-recorded programs into BSL) increased the pool of in-vision BSL interpreters to include both deaf and non-deaf professionals.

If we want to understand the in-vision BSL signer's semiotic repertoire, then acknowledging the history of BSL on screen, and therefore its distribution between people, places, and times (Pennycook, 2016), helps us to understand the types of languaging practices that can be drawn upon to create the semiotic assemblages within this broadcast medium.

Much like with Canagarajah (2018, p. 37) where “communicative activity involved diverse other semiotic resources beyond words” for communication, the weather forecast draws upon multiple resources to communicate the weather predictions for the current day and days ahead. Meaning making by the weather forecaster presenters and in-vision BSL interpreter-presenters in this context draws upon all of the semiotic resources at their disposal to create a coherent composite signal, or assemblage, that the constructed audience is presumed to understand. By examining this meaning making without a present audience or interlocutor we can explore resources used and the time course of their use when constructing their semiotic assemblages. Identifying the resources and timings enable us to see what differences there are between the assemblages produced by the English-speaking weather forecasters, and those produced by the BSL-signing in-vision interpreters.

We can conceptualise the presentation of weather forecasts to an audience by in-vision interpreter presenters in *BSL* as being similar to the presentation of information in a classroom, where the presenter is viewed by the audience akin to a signing teacher in front of a classroom of deaf students. This interaction uses a variety of semiotic resources and is analysed as *chaining* by Bagga-Gupta among others (Bagga-Gupta, 2017; Gynne & Bagga-Gupta, 2013). As in a classroom for deaf students, the presenter like the teacher uses lexical and gestural resources to interact with information on a board and other artefacts. The use of the board in the classroom is akin to the weather map, satellite pictures, etc. on the composite broadcast image (described in greater detail in the next section). There is also some interaction with the written English on the maps and lower third of the broadcast image, so in that regard, as Gynne and Bagga-Gupta (2013) rightly identify for classrooms, even though this in-vision interpretation is in *BSL*, it is actually both multimodal and multilingual.

Gynne and Bagga-Gupta (2013, p. 483) state that “chaining is conceptualized in terms of emic ways in which human beings connect oral, written and other semiotic resources

including different modalities in the course of naturally occurring daily life. It is chaining in and between such resources that creates a communicative flow.” Even though the use of semiotic resources is similar to the one described in the concept of “chaining”, the lack of communicative flow with the viewing audience means that the findings we present here cannot be fully conceptualised in this way.

Furthermore, the timing of the layering of semiotic resources for the non-present audience is a relevant notion for the analysis of our data, particularly due to the fact that the BSL presenters render information into *BSL* from English (*and other resources*) in an interpretation rather than in direct communication with an interlocutor. The context of a purely passively viewing audience is important to keep in mind when discussing our findings.

One further consideration in the distributed nature of the *BSL-presented weather* is that Deaf BSL presenters have presented news broadcasts, and other genres of information giving programmes to deaf BSL-signing audiences since the late 1970s. These have not included weather information and this, if given in BSL, is something that has only been presented as a rendition of the English original rather than produced as a BSL original. In that regard there is no emic model for BSL weather presentations. In addition, in the UK currently there are no deaf BSL-signing meteorologists and those rendering the English original into BSL are not meteorologists either. As such, their use of the other semiotic resources and the timings may well differ from those of the weather forecaster presenters, as we see below.

It is now worth considering the semiotic ecology of the mainstream audience viewers and seeing how that differs from the semiotic ecology of the BSL-signer viewer.

What is the semiotic ecology of the mainstream viewer?

As with many television broadcasts (Yang, 2018), weather broadcasts include a variety of semiotic resources for the presenter to take advantage of when presenting weather to the

mainstream audience. Typically, the weather presenter will speak their weather report and although it is prepared, the presentation is often modified according to ever changing time constraints. That is to say while the presentation is prepared, it will contain some spontaneous moments; the weather is not therefore scripted per se.

In addition to the spoken language resources, in this case spoken English, we often see written (English) on the screen, e.g. the name of towns, meteorological terminology such as 'high' or 'low', etc. We also see pictorial information on the screen presented simultaneously with English linguistic resources. This pictorial information might be photographs of places to show different types of weather, satellite images showing evolving cloud formations, maps of different areas, lines to represent isobars, etc. and brings in the semiosis of images for reference.

And finally, we have co-speech gestures that are produced, i.e. gestures that are co-articulated with speech to form a semiotic assemblage in a dynamic relationship with the other artefacts seen in the composite image. These may be static or moving and maybe co-indexic with speech, and/or with either written, and/or pictorial information. The gestures that are seen by the audiences as placed on the pictorial information, are, in reality, produced against a green screen, which is then superimposed on to the picture when broadcast. The weather presenters are able to see the composite image on a camera in front of or monitor to the side of them in the studio, as described above.

The (non-present) audience is presumed to be able to draw upon the semiosis of the different resources to better understand the (meteorological) weather information presented to them. The audience is expected to view these competing and/or complementary multimedia semiotic resources and assemble them to make sense of the meteorological science being presented to them. That weather presentations have been delivered since the 1920s, also helps us understand that this semiotic practice happens within a specific moment and place, and

that this has a historic trajectory with potential diachronic change. The distribution of this semiotic practice via broadcasting contributes to this diachronic change, with today's audiences no longer naïve to weather broadcasts, after almost 100 years of experiencing them. Even so different audiences will have different levels of meteorological literacy, and place different weight on different semiotic resources when trying to understand the weather.

What is the semiotic ecology of the British Sign Language viewer?

For the British Sign Language viewers of the 'BSL' in-vision weather broadcasts, firstly there is a presumption that the audience cannot hear the English spoken by the weather presenter. Even though there may be more people who sign BSL and can hear (De Meulder & Murray, 2017), the legislation that brought about in-vision BSL for the news, and thus weather broadcasts, formed part of various equality measures to ensure that deaf BSL signers could access at least a certain percentage of broadcast television (Ofcom, 2017).

Presuming that the principal audience is a deaf audience of BSL signers, it is then worth first considering the sensory ecology of these audience members, one based on vision and seeing (for the purposes of this analysis). The BSL audience can see that English is being spoken by the weather forecaster, they can see the co-speech gestures by the weather forecaster, and now in the age of digital broadcasting will have automatic subtitles providing a written English version of the spoken English. Thus, in this semiotic ecology we have written English: as subtitles, on the maps, and graphics, etc. The BSL in-vision presenter does not see the English subtitles in the studio as presented to the audience at home, i.e. two lines of text visible on a screen that has varying synchronicity to the spoken English of the weather forecaster presenter. They may, however, be conscious of the deaf BSL signing viewing audience for whom they are creating their rendition, who will have those scrolling

English subtitles on their screens at home. This could inform some of their rendering decisions, but at this moment we do not have data that addresses that issue.

In addition to the written English and weather forecaster presenter's gestural resources, we have BSL presented by the in-vision interpreter-presenter. Sign language using deaf people, their families, and social networks, engage in gesture rich communicative exchanges and so we see a BSL semiotic resources and co-sign and pro-sign gestural resources (Kusters & De Meulder, 2019) in addition to the categorical and gradient linguistic resources. For the BSL in-vision presenter we not only have the pictorial information that can be co-indexed, but also the co-speech gestures of the weather presenter. The BSL in-vision presenter can see the gestures used by the weather presenter and can use this as a semiotic resource, should they wish to, by pointing at these gestures, or incorporating elements of these gestures (handshapes, movements, etc.) into their BSL in-vision semiotic assemblage of the weather news.

The BSL in-vision presenter can also draw upon the mimetic language or ideophone resources of BSL to co-index information that can be seen on the screen. As noted above, BSL has a rich repertoire of gradient linguistic elements, depicting sensory imagery (Dingemanse, 2012, 2018); for sign languages this means depicting the shape and/or movement of an (animate or inanimate) object (Dudis, 2004). They are used pervasively and can be isomorphic with co-speech gestures used in the speech communities that surround the signing community(ies). The use of these mimetic forms allows for the co-indexing of other pictorial information and so forms part of the communicative action. To this extent at least, they enable us to identify both simultaneous and consecutive semiotic assemblages (an analogue of *chaining*) in BSL in-vision interpreted weather presentation.

For the BSL audience, then, we see more semiotic resources that can be drawn upon to understand the weather information, than for the mainstream audience and by the weather

presenter. At this juncture it is important to note that while the mainstream audience, viewing the news channel with the BSL in-vision presenter, can of course see these semiotic resources, in the main they are opaque to that audience. At some points the BSL and co/pro-sign semiotic resources can seem transparent to that audience, and BSL in-vision interpreter presenters can be mindful of mainstream audience sensibilities (see Stone 2009, for a further discussion). Even so, the goal of the BSL in-vision presenters is to effectively render the information for the BSL signing audience (Stone, 2009, 2019); while the visible elements might be tempered to consider mainstream audience sensibilities, the timing of the semiotic assemblages are coordinated to ensure that sign language using ‘people of the eye’ (Bahan, 2008) can comfortably view the co-present resources, to maximise understanding appropriate to the sensory ecology.

Let us now look at the use of resources and the timing of the semiotic assemblages of the weather forecaster presenters and the in-vision BSL presenters.

The data

This study draws upon broadcast television national news from the UK, broadcast by the BBC from January to April 2018. Four BBC breakfast news clips were retrieved via learningonscreen.ac.uk, a resource made available for higher education institutions to access broadcast television in the UK, two featuring deaf BSL presenters and two featuring non-deaf BSL presenters. The data is part of a larger study aimed to explore similarities and differences between deaf and non-deaf interpreters, and those raised using BSL (both deaf and non-deaf) and those who learned BSL later in life, to see whether the assemblages of semiotic resources differed between these groups. This is not however the focus of this analysis. Ethical approval was sought from the ethics committee of the University of

Wolverhampton for both the analysis of broadcast footage and interviews of the in-vision interpreter presenters. Here we are focusing on the broadcast footage analysis.

For this analysis we are using excerpts of the interpreted breakfast news recordings to specifically compare the weather forecaster presenters' and the BSL in-vision interpreter-presenters' semiotic assemblages. We are interested in whether different semiotic resources are used, and whether the timing of the use of these semiotic resources differs between spoken English and BSL presenters. ELAN was used to analyse the data, coding for the speech of the weather forecaster presenter, their manual gestures, body gestures and gaze. For the in-vision BSL interpreter-presenters their signs, other manual gestures, body gestures and gaze were coded. The use of these semiotic resources was then analysed in light of the other visual information on the screen such as written English, maps, graphics, meteorological information, etc, to better understand the semiotic assemblages of the presenters and their simultaneous or consecutive assemblage.

We will now describe the semiotic resources used and the time course of the semiotic assemblages; a series of images will be shown (below) to represent the changing movement seen on the broadcast rather than ELAN transcripts. We believe that the images are more applicative to demonstrating the differences between semiotic assemblages used by the (spoken English) weather presenter and the BSL interpreter-presenters. They also allow the reader to more clearly see the specific characteristics of these assemblages in the BSL interpreter-presenters' renditions

The Weather Presenters

Typically, we will see the weather presenters on the screen superimposed on to an image behind them (see fig 1 below for an example). Often these are maps of the country or region, as in fig. 1, and, as noted above, have written information (i.e. the names of cities and an

aston or lower third) and numbers (i.e. the temperatures and the time). We also see colours on the map (not visible in the black and white image here) with blue being used to represent temperatures of zero degrees Celsius or lower, and green as above zero degrees Celsius. These semiotic resources are simultaneously co-present on the screen viewed by the mainstream audience.

The materiality of the studio comes into play in that the broadcast composite image is viewed by the weather presenter on a screen in the studio. They check the positioning of their body and their indexing gestures on the composite image, which leads to eye-gaze and co-indexic pointing that is then seen by the audiences on the broadcast. To note this additional layer of materiality we write the studio-based action followed by the (action by the audience on the broadcast) in parentheses.

Use of gaze

In figure 1 we see typical images of a weather forecast presenter. We also see the three types of gaze used, looking at the camera (at the audience) while saying “hi there”, implying a direct address to the viewer; looking at the monitor (at the map) while saying “I just want to show you..”, thus interacting with the map they cannot see at this moment; and looking at the camera (audience) while pointing at the green screen (pointing to a specific area of the map) while



Fig.1 The weather presenters look to the audience, or to the graphic.

saying “now over the snow fields of Scotland ...”. In the latter example, the weather forecaster utilises his gaze to the monitor in front of him, which has the composite broadcast image, to determine positioning of his gesture while giving only the impression of looking at the audience. The looking and pointing towards semiotic resources direct the attention of the audience and are co-indexic with the spoken English. This languaging practice shows the assemblages that the weather forecaster presenter uses to communicate effectively using the semiosis available.

Use of co-speech gesture multimodal simultaneous semiotic assemblages

Not all of the co-speech gesture is articulated against the screen; unsurprisingly weather forecasters also use co-speech gestures like everyone else in general speech/communication (Pagán Cánovas et al., 2020), as seen in fig. 2. These gestures can be container gestures (Mittelberg, 2018) as seen below , or beat gestures (Leonard & Cummins, 2011), or gradient



Fig.2 Co-speech gesture “what’s going on...”

gestures that co-index the spoken English, e.g. “spreading”, with open palmed hands becoming wider. We also see pointing gestures that clearly index the pictures on the screen.

In fig.3 (below) we see simultaneous indexing of two areas of the map, while saying “the massive temperature contrast”. Here the semiosis of the map, the colouring of the map, the numbers, the spoken English resources, and the index-finger pointing gestural resources,



Fig 3. Two index-finger points “the massive temperature contrast...”

are co-presented as a single communicative action, for the audiences. The pictorial semiosis is simultaneously co-indexic with the language resources and gesture resources pragmatically enriching each other.

So far, the indexing described has been static, there are also instances of moving indexing. In fig. 4 (below) we see an open hand rather than an index finger deity gesture. The hand traces an arc from the lower left-hand corner of the green screen (the south west of the UK on the map) twice. Firstly, the back of the hand traces the path as the weather forecaster



Fig.4 Tracing the movement of weather patterns, “that milder air, the moist air”

presenter says, “the milder air”. Secondly, the palm traces the path as the weather forecaster presenter says, “the moist air”. Here we see that not only does the semiotic assemblage draw

upon the map semiosis, and the spoken English resources, but also the handshape of the gesture resources presents a moving entity, in this case understood to be moving air, tracing its path, with the orientation change (ulnar-radial rotation) helping to emphasise the different characteristics (mildness then moistness) highlighted in the spoken English resources. In this way, the prosody of the spoken English is enriched by the gestural resources' repeated movement.

Even though so far we have described the monolingually presented weather forecast, we still see that the presenters draw upon the materiality of the composite image to co-index their linguistic and gestural resources, engaging in the materiality of the broadcasting context, and the written resources, thus engaging in multimodal meaning making. We see that the language and gesture resources co-index and enrich each other in a simultaneous assemblage.

Let us now consider the in-vision BSL interpreter-presenters.

The In-vision BSL Interpreter-Presenters

The team of BSL interpreter-presenters working for the media company that currently provide the in-vision BSL for the BBC, are a team of interpreters (some staff, some freelance) who regularly have training/professional development events as a team. These professional conversations have led to some conventions of multimodal languaging practices (Stone, 2019) that aim to facilitate an unmarked BSL version of the broadcasts being rendered. Often known as a covert translation (House, 2010), this aim of creating a function equivalent in the target language (i.e. a BSL *presentation* of the English broadcast) clearly needs to take into account the multimodal nature of BSL using communicative actions. This includes ensuring that those with a sensory ecology based on vision will be able to see and have their attention directed to the different resources, viewable on the broadcast, i.e. the written English and the pictorial information, in an appropriate manner. They present the

BSL in-vision rendition of the weather in a remote studio separate from the weather presenter studio, standing in front of a green screen.

For the weather forecasts, this BSL version needs to ensure that appropriate multimodal strategies are used, not least in the acknowledgement that English is known to (British) deaf people, amongst others (Tapio, 2014), and also provides a linguistic resource that can be referenced in a weather presentation semiotic assemblage. However, in the context of the BSL version it is unclear whether there *should* be an acknowledgement of the ‘co-presenter’ of the weather, i.e. the weather forecast presenter. The multilingual and multimodal nature of the broadcast could facilitate acknowledgement of the weather forecaster presenter, or at least some co-indexing of their meaning making with respect to the timing of the semiotic assemblages, or the co-indexing of gestural semiosis presented by the weather forecasters.

As mentioned above, the BSL in-vision interpreter-presenter sees the presentation of the weather forecaster, but the weather forecaster does not see the BSL in-vision interpreter-presenter. Much in the way that the weather forecaster presents to a camera and green screen, and is able to see a composite image by looking at a monitor in the studio, the BSL interpreter-presenter sees the image of the weather presenter on the monitor above the cameras in the studio, and a composite image of the weather presenter with BSL in-vision presenter in a monitor to the right hand side. Thus, looking at the monitors enables the BSL in-vision presenter to see the audience view and adjust their multimodal, multi-resource BSL version accordingly.

Now let us move on to the examination of the resources used by the BSL in-vision interpreter-presenters.

Use of gaze in the BSL – simultaneous assemblages

Firstly, let us consider the use of gaze, as we did above for weather forecaster presenters. In the example below (fig. 5) we see the hearing news anchors talking to Stav, the weather presenter, as a segue to the weather forecast. This is a typical format, and we see in the first still image of figure 5 the BSL in-vision presenter pointing to the screen with their index finger as the screen is about to change. The British Sign Language linguistic matter of one of



Fig 5. Temporal gapping “Keeping an eye on the weather Stav, what are you seeing?”

the sign variants for LOOK is articulated with the right hand, and the gestural matter, an index pointing to the green screen (image of the presenters on screen), with the left hand.

The timing of this assemblage differs from the weather forecaster presenter above in that it is pre-emptive of the picture that will occur on screen rather than pointing to the image that is already there. The timing of the gesture anticipates the pictorial information. This is a simultaneous assemblage of linguistic and gestural resources not dissimilar to those used by the weather forecaster presenter but with linguistic and gestural elements produced within the same modality.

Multimodal multilingual consecutive assemblages

If we continue examining the example in figure 5, we see that the screen changes from the anchors in the main studio to the weather forecaster presenter in a different studio. The BSL in-vision presenter then signs WEATHER followed by an index point and gaze to the screen.

This gaze with accompanying torso movement (spinal axis) including head, directs the attention of the viewer to the pictorial information and leaves a temporal gap. In this example, this allows time for the viewer to see the gesture resources sequence of the weather forecaster presenter (as shown in figures 3 and 4 above). This not only acknowledges the presence of the weather forecaster presenter, but also allows for the deaf viewer to view the gestures (and of course to read the English subtitles should they wish to do so).

In this example, part of the assemblage includes directing the attention of the viewer to information available on screen, which includes the gestural resources of the weather forecaster presenter. The consecutive assemblage of the languaging practice is then both multilingual and multimodal. The *covert* BSL version overtly refers to the semiotic resources available on screen rather than co-presenting the weather in place of the weather forecaster.

This use of consecutive assemblages is also present with other kinds of multimodal resources, e.g. when the gaze of the BSL in-vision presenter directs the attention of the



Fig 6. Looking at the English - “some frost and ice to contend with”

viewer to written English on the screen. In figure 6 (above), we see that the weather forecaster presenter co-indexes his speech with a full hand index to the green screen (graphic with written English) while gazing to the camera (the audience). The BSL in-vision presenter finishes the sign they are articulating, and then also indexes the green screen (graphic with written English) while gazing at the camera (the audience). The assemblage is then completed with the BSL in-vision presenter looking at the monitor (the graphic, the written

English, and weather forecaster presenter) where again both gaze and torso direct the attention of the viewer to the *on-screen* infographic.

Gaze, head position and torso position play a significant role in signalling the type of assemblage (consecutive or simultaneous) and also are used to indicate the duration of a consecutive assemblage. As seen above in fig. 5 the interaction of torso and head position when combined with the use of index finger, eye at screen, head facing screen, and torso shifted towards screen indicate the consecutive assemblage will be longer, including time to watch the screen, in this instance the gesture sequence of the weather forecaster presenter.

There are times when the gaze is used at the same time as the weather presenter forecaster to create a symmetric gaze index to the green screen (composite broadcast



Fig 7. Shared looking - “down towards the south east of England”

image). In figure 7, we see that both presenters are looking at the green screen (look at the map with its associated semiosis) (a gestural resources index) while producing language (either spoken or signed). The torso positioning is different as the spoken English can be produced while not bodily facing the camera (the audience). For the BSL presenter while the head position is aligned with gaze also indexing the green screen (the map), the torso faces the camera (the audience).

Here the simultaneous assemblage clearly denotes that there is further information to be seen but that the linguistic resources will continue to be used. We know that the peripheral vision of deaf people is different from hearing people; deaf people react faster to objects in

their peripheral vision (C. Codina et al., 2011, 2017). The simultaneous use of head position and gaze alignment, with a different torso and language alignment are appropriate for the audience with a deaf-vision sensory ecology. This invites the audience to glance at the broadcast images but not to sustain one's gaze there.

This use of head position and gaze can occur co-indexically with other linguistic and gestural elements. In figure 8 we see that torso position is aligned with the linguistic resources in the BSL in-vision interpreter presenter; it also aligns with the torso of the



Fig 8. Isomorphic gesture and sign - “around the coast some of those will be thundery”

weather forecaster presenter on the torso-spine axis, and so in that sense is co-indexic with the forecaster. On the torso-waist axis, the BSL in-vision interpreter presenter is not aligned with the weather forecaster, as he is leaning towards the green screen (the map) as a form of pointing and thus directing the audiences' attention to information sources on the screen. While a first glance, body postures of forecaster and BSL interpreter-presenter may seem dissimilar, more detailed distinction reveals both alignment (torso-spine axis) and co-indexing with index finger pointing (torso-waist axis).

In addition, we see that the left hand of the weather forecaster presenter is using a full hand index. This is mirrored by the BSL in-vision interpreter presenter, although using his right hand. Here the BSL sign COAST uses a full hand and coincides with the gesture of the

weather forecaster, so although they are isomorphic, they are not intentionally co-indexic. Rather the sign COAST is produced tracing the coastline of Scotland and so is co-indexic with the map rather than the weather forecaster presenter.

The use of the index point by the BSL in-vision interpreter presenter is however, co-indexic with the green screen (images on the screen). Again, the gaze directs attention to the additional semiosis available to the viewer, but marks this as a short opportunity to glance rather than a longer opportunity to look (as we would see in a consecutive assemblage) as the torso (spinal axis) and head are not aligned.

Mimetic language resources

As noted above, one of the further elements that can be used to co-index pictorial information by depicting sensory information, is mimetic language. In figure 9, we see the presenter using



Fig. 9 Co-indexic mimetic language - “this weather front which will move”

a sequence of co-speech gestures (index finger then full hand then index finger) while talking about a weather front moving in from the Atlantic. The index is used when saying “the only change we will see is”, the hand then changes to a full hand to co-index “this weather front”, where the moving blade of the hand co-indexes the movement in the movement of the band of grey and blue, representing clouds and potential rain. Then “it will bring outbreaks of rain” is co-indexed with an index finger sweeping down the green screen (the west coast of Scotland).

For the in-vision BSL presenter, firstly, there is an aligned pointing of index finger, gaze, and torso-spine axis that is co-indexic with the pointing for the weather forecaster presenter, thereby drawing the attention of the deaf audience to the map and the weather movement there. We then see a handclasp and looking, which creates a consecutive assemblage as we see in other examples above.

He then produces the sign SCOTLAND (image 3 in fig.9) with an index finger point at the green screen (the map and weather presenter) with a head position and commensurate gaze change, followed by depicting a long, thin object resembling the shape of the weather front on the map, which is constructed in the signing space in front of his body and is co-indexed by gaze and head position (image 4 in fig. 9). The mouth gesture of pursed lips also co-indexes the shape being depicted via echo phonology (Woll, 2001), enriching the notion of long and narrow. This depiction then is a simultaneous assemblage that co-indexes the semiosis of the map with weather elements superimposed, creating a depiction of that semiosis linguistically but using several elements to compose the language part of the assemblage.

Whilst both the presenter and the interpreter are using pointing and gesture to aid understanding, they are using their resources in distinctly different ways. There is a marked difference between the spoken and signed language expressions in the way co-communicative gesture is used in this example: where the presenter chooses co-speech gesture with the aid of the map, adding approximative geographical information to his remarks in his gesture resources, the majority of information is given in his language resources. The assemblages are all simultaneous and co-indexic with spoken English.

The in-vision BSL interpreter presenter, however, uses both consecutive and simultaneous assemblages. In this instance, there is a simultaneous assemblage that draws upon both language and gesture resources including a hybrid gradient linguistic token to co-

index language, and gesture, with the weather forecaster presenter's gestures and the map and weather image semiosis.

Discussion

The television broadcast weather forecast shows a complex interplay of language and gestural resources, indexing, co-occurring with artefacts in the broadcast image, that are used to create simultaneous assemblages for a hearing mainstream audience. The layering of these semiotic resources suits the sensory ecology of the mainstream audience. They are assumed to be able to hear the spoken language lexicon, have some familiarity with weather forecast semiosis, and comprehend the simultaneous assemblages as a gestalt.

We see three types of gaze by the weather presenter: either at the audience, at the map, or at the audience while pointing. The gaze patterns are simultaneously co-indexically enriching each other within the assemblage. The weather presenter is monolingually presenting the weather using the composite broadcast images as artefacts to co-index both linguistically and gesturally, deploying appropriate semiotic resources to both engage in multimodal meaning making and simultaneous semiotic assemblages.

When an in-vision BSL interpreter presenter is added to the broadcast aiming to serve a deaf 'BSL' signing audience with a visual sensory ecology, then the multimodal semiotic assemblages are multilingual. And the semiotic assemblages can be either simultaneous (like the weather presenters) or consecutive. Not only are these assemblages used to ensure that the visually oriented audience can have their attention directed in a timely fashion, but the multimodality of the available material resources are deployed in the communicative act to offer a choice to the audience that relies not solely on language, but incorporates many available semiotic resources on screen. This includes the weather presenter as an artefact with gestural resources that can be levered to provide additional semiosis for the assemblages.

The timing for pointing, whether via gaze, index finger, hand, torso-spine axis facing, torso-waist leaning, or an aligned combination of those, can be either pre-emptive, or consecutive, as described in figures 5 and 6. The BSL interpreter-presenter is able to draw on the various resources by using timing as a semiotic resource as part of their assemblage, depending on the aim of the message to be conveyed. Moreover, timing as a semiotic resource is appropriate for the sensory ecology as it offers the deaf audience the choice to change the focus of their attention; this is however an offer, not a necessity. In this sensory ecology the deaf viewer may want to gather information from semiotic resources in composite broadcast image (e.g. infographics, etc.) while watching the weather report, rather than having to focus on one element of it, i.e. the in-vision BSL interpreter-presenter. These decisions on the part of the BSL interpreter-presenter would appear to be a part of the *distributed* nature of these semiotic assemblages, although this warrants further investigation.

In addition, the in-vision BSL interpreter-presenter may choose to not only point out or co-index the semiotics resources available on screen, but also to depict them using mimetic language and its gradient linguistic semiotic resources, as shown in figure 9. This benefits the audience by aiding their recognition of objects or features of the on-screen information from mimetic language depiction (i.e. both gradient and categorical elements), rather than the less well-defined gestural resources used by the weather forecast presenters.

Conclusion

The data we have analysed provides a useful comparison between semiotic assemblages used for a mainstream audience, and those used for an audience with a deaf sensory ecology. With a non-present audience, we see how individuals use semiotic resources to make meaning in the absence of co-construction. The layering of these resources are dependent on the assumed sensory ecology, where timing as a semiotic resource is paramount. The techniques used by

in-vision BSL interpreter-presenters may provide useful examples and strategies that can be identified in other monologue settings as well.

It would appear that BSL interpreter-presenters assume using categorical and gradient linguistic resources, and gestural resources that index the artefacts in the composite broadcast image (both simultaneously and consecutively) create optimal semiotic assemblages for the deaf audience. This would need to be further explored by the interviews that we plan to hold as part of the larger study. And by better understanding how viewers watch the weather forecasts, i.e. what are they looking at and when. Knowing this could have implications for our understanding of sensory ecologies, timing as a semiotic resource, and the construction of semiotic assemblages.

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