Maps, mobility, and perspective: remarks on map use in producing an orienteering course

To cite this paper:

Pehkonen, S., Smith, T.A. and Smith R.J. (2021) Maps, mobility, and perspective: remarks on map use in producing an orienteering course, *Mobilities.*

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1. Introduction

This article presents an ethnomethodological and conversation analytic treatment of map reading's work in the case of setting out and checking an orienteering course. Contributing a further empirical study to the classic ethnomethodological concerns with the map as a radically emergent, reflexively constituted, phenomenal object (Psathas 1976; 1979; 1986b; Liberman 2013), and more recent research on navigational practices that incorporate conversation analysis (Smith et al. 2020), we aim to explicate some of the sequential-

categorial features of route-setting and route-following as significant human mobility practices. We aim to demonstrate how such mobility practices as route-setting and route-following are accomplished-in-interaction via various sequential and categorial resources. Moreover, we show how the work of orienteering course-setting provides a perspicuous setting for the description of how map-work necessarily involves the incorporation of other relevant perspectival categories-in-action, in this instance, route-planners, route-checkers, and route-followers.

In this article we draw from two orienteering contexts from Finland and the UK. We analyse and discuss the practices of *course-setters*, who set out the course, based on the instructions provided by course-planners, and *course-checkers*, who check that locations visited on a course are correctly positioned on the map and the ground for competitors to find, and may change these locations. We demonstrate that attention to the sequential and categorial resources used by participants highlights various methods through which members produce and recognise aspects such as certainty and uncertainty, how participants orient to shifting perspectives tied to projected membership categories, and the categorial organisation of perception-in-action (Hester and Francis 2003; Laurier 2013; Smith 2019).

2. Orienteering and the chiasmatic reflexivity of map reading's work

Orienteering involves competitors moving between specified controls, or way-points, that have been planned by course-planners, marked on a map, ahead of being laid out, physically, by course-setters, and checked by course-checkers. To differentiate between these roles, we adopt the following terms throughout: (1) course-planners, who plan the route in advance,

creating the map; (2) course-checkers, who check the way-points, and may modify them on the ground or the map; (3) course-setters, who, before the course begins, set out the control or way-points, but cannot modify them, and; (4) route-followers, who are the competitors in the final event. We reference each of these categories of map user as we go, drawing out their contribution to our perspective on orienteering.

The use of maps has long featured as a setting for ethnomethodological tutorials, yet there have been fewer empirical studies of the detail of the map's work in ordinary activities. The interest, for ethnomethodology, has been how: 'As territorial objects in a phenomenal field, the map's properties of order are chiasmically[1] chained to the travelling body's way-faring practices' (Garfinkel 2002: 130). By chiasmic reflexivity we mean that like other 'docile texts', the practical relevancies and properties of the map are revealed in use, rather than in abstraction, and, moreover, that the phenomenal properties of map and landscape are reflexively constituted, in motion. In this sense, that of which a map may consist is a practical and publicly available matter, rather than internal or cognitive matter (Laurier and Brown 2008). Laurier et al.'s (2016) work on smartphone map-reading-whilst-walking provides one example of this chiasmic reflexivity, whereby making sense of the map, and one's position on it, occurs in tandem with walking actions both responding to and accomplishing the environment-as-encountered, in concert with the representation of that walking on the map as the 'blue dot' on the phone screen.

[1] 'Chiasm' – … every relation with being is simultaneously a taking and a being taken, the hold is held, it is inscribed, and inscribed in the same being it takes hold of. (Merleau-Ponty 1968: 266 in Liberman 2013: 53).

Maps and journeys have, of course, been of interest to the social sciences more generally. An orientation for much ethnographic work is the writings of Tim Ingold and his critique of the spatial logics of abstraction and inversion. Ingold (2009: 29), notably, develops an argument 'against space' as an abstraction, 'detached from the realities of life experience'. Humans make their way through and with, and *inhabit*, environments and landscapes. Euclidean and Cartesian logics of abstraction make life itself an internal property of pre-existing things occupying the world, rather than being 'woven from the strands of their coming into being' (2000: 29). Ingold (2000), therefore, finds that formalised map-making and, consequently, map-use, can separate the traveller from traditional practices of wayfaring, and particularly so in urban space (Smith, 2014). The first critical observation we make of this is, throughout daily life, technologies from shoes, to the urban architecture of street layouts, to maps, and later, smartphones and GPS, have transformed the character of wayfaring, rather than erased its possibility (Carbonell Carrera et al. 2018; Laurier et al. 2016). Secondly, map-users *do* use ordinary, intersubjective practices to read maps on-the-way, rather than simply following a predetermined route through space (Laurier et al. 2012; Laurier and Brown 2008). Maps are not static representations that produce single actions (Goodwin 2000b), and map reading might be understood as reflexively, although asymmetrically, tied to mobile practices, producing emergent and diverse possible actions (Haddington and Keisanen 2009). What remains unremarked in Ingold's analysis, among other things, is the *intersubjective* work of finding the way: humans often journey together. Recognising this prompts a respecification of the collaborative, *in vivo*, untangling of map logics as a members' concern and accomplishment.

2.1 Route logics and categorial perspective

Route planning and route following was the topic of classic ethnomethodological tutorial exercises (Garfinkel 2002; Liberman 2013). Students were chosen to design a sketch map of a route which would then be followed by the other students. The destination was not given, and the maps only provided rudimentary details for their followers. What the tutorials demonstrate is how the map's and planner's logics, often unreadable in the classroom, revealed themselves to the followers as they moved with the map. As discussed above, the maps are chiasmatically accomplished as adequate maps for the journey in and through journeying's work. What we are particularly interested in here is how the following of the map also incorporates what we might call the planner's perspective; a gloss for a series of potentially relevant category predicates including rationality, intention, knowledge of the terrain, knowledge of the destination and so on. An illustration is provided by one of the reports from Liberman's (2013: 62) students:

> At first, we were unsure whether or not the trail off the side of the buildings was the right one … We weren't sure whether or not the map was referring to a trail leading off the side of the building, which would have required us to step onto Contax building property or another trail entirely.

Here, the uncertainty concerning which trail the sketched route referred to was occasioned by it leading on to private property which is assumed to something the route planner would not, and could not, have intended them to do. Liberman (2013: 66) later explains this as 'a reader or directions-recipient will frequently assume that the map designer's selection

reflects some familiar knowledge about which route is the easiest one'. We think this point warrants further attention and indicates how the reading of route-maps includes category-bound predicates of the route creator including providing a reasonable, logical, followable, possible, non-hazardous route to be followed in good faith, and not a wild goose chase.

In what follows, we demonstrate this orientation to what we are calling the planner's perspective in the activities of course-checkers and course-setters for the activities of orienteering. In building on this observation, we also demonstrate how course-setters and course-checkers topicalise the competitor's perspective in laying out the course in a mediation of the intentions of planners, alongside the navigational needs of the competitors, and the environmental resources that competitors might come to use, depending on their trajectory towards any control point. Route-checking and route-setting thus finds members tracking back and forth between pre-hoc planning rationalities, and projected possible in-world perspectives of route-followers as they follow the route and approach the controls.

How the categorial work of course-planners and route-followers intersect is critical for our study. Previous studies of verbal direction-giving (Psathas 1986a; 1986b) and occasioned maps have participants come to each new map or directions as a 'non-native speaker' (Liberman 2013: 53), where 'the notations on a map gain their sense and reference from what they find during the way-finding' (Liberman 2013: 57). In other studies, however, members draw on prior experiences to navigate different contexts (Haddington and Keisanen 2009). Accomplished orienteers are well-versed in the generic formal structures of orienteering and topographic maps. They know what map symbols denote, including contour lines for rising or falling elevation, and symbols for features such as rivers, forested terrain, paths, tracks, and

fence boundaries. They most likely do not know the landscape in which they move. In orienteering, the route travelled between control points is a choice for the participants and so any actual journey is more dynamically and reflexively organised than in, for instance, following a course that has been fully marked on the map. A further distinction between these navigational contexts and others is, then, that the logics of course-planners, as available through the map positioned in a landscape, form an inferential resource for assessing the 'correctness' of a route (Mottet et al. 2016). That is, for the orienteer, a route that is 'correct-for-practical-purposes', their relative skill levels at traversing different terrains, and the degree to which they are aiming to be competitive or not. So, it is in the reflexivity between formal map features, navigational practices, and the encountered terrain in which the relationship between the orienteer as route-follower, the course-planners and course-setters, and the orienteers' common-sense assumptions of the course-planner's perspective emerges.

2.2 Displaying certainty and uncertainty

In any orienteering journey, competitors continually work with the relevancies of encountered environmental features in reaching the next designated, or selected, point (Omodei and McLennan 1994). To be clear, whilst the points of the journey are predetermined and marked on the ground, the route between them is not. Orienteering is thus perspicuous for exploring the practices through which different features of the environment are arrived at on the move, as well as how this is negotiated through ongoing assessments of the perspective of other categories of map user (Mottet et al. 2016; Murakoshi 1997).

The intersubjective character of journeying's work – for course-planners, course-checkers, and route-followers – is observable in accountable displays and topicalisations of certainty and uncertainty. A feature of Liberman's (2013) occasioned map tutorials was the joint accomplishment of the confidence that the journey the students followed was indeed the journey the designer of the map (other students in the class) had intended them to make. As Brown and Laurier (2005a), Haddington and Keisanen (2009) and Smith et al. (2020) all find, wayfarers often proceed even when there is little existential certainty about their environment, location, 'correct' route, or where precisely they must eventually end up. 'Getting on the map' (Garfinkel 2002) and having 'just enough' existential certainty to proceed is a common resource for enabling mobility, assuming that a degree of 'grounding' will occur once new perspectives develop and environmental resources emerge (Smith et al. 2020; Laurier et al. 2016). Referring again to the wayfinding of students in his map tutorials, Liberman (2013: 62) questions how wayfinding occurs when there is little certainty available:

> Of *just what* does the confidence of the way-finder consist when it is built upon so rickety a framework? Part of the dynamic can be attributed to the nature of the face-to-face social interaction between the person giving the directions and the one following them, where the recipient may feel obligated to gratuitously grant to the direction giver that the directions are clear.

As we describe below, the 'obligation' is perhaps a little less demanding than Liberman's Goffmanian formulation suggests. In our data, displays of certainty and uncertainty in a route

are fleeting and, we suggest, more indicative of emergent moments of commitment and resistance to an unfolding route's work than necessarily out of obligation to the other party. Joint activities are permeated by asymmetries between participants and with respect to their environment (Stevanovic and Monzoni 2016). Previous studies have illustrated how the modalities of walking itself, such as pausing, stopping, re-orientation, and shifts in pace or direction, may offer accountable displays of uncertainty or certainty (Laurier et al. 2016; Smith et al. 2020), as does topicalisation of environmental objects, particularly if the object is not currently visible and therefore has limited epistemic access (Fukuda and Burdelski 2019; Smith and Goodwin 2019). As we show, 'uncertainty' and 'certainty' can be produced verbally and non-verbally, and in ways chiasmatically bound to relevant features of the landscape.

2.3 Categorial and sequential resources in navigation

Navigating is an inherently perceptual accomplishment. How semiotic fields and resources are organised and used is a longstanding concern of ethnomethodological analysis. Where previous studies have demonstrated how semiotic features of the environment are orientated to in producing embodied activities (Goodwin 2000a; 2003), they largely focused on somewhat 'static' encounters (e.g. Goodwin 2000b; Kääntä 2014; Keevallik 2018), rather than how features are encountered and accomplished on the move. Studies of mobile route finding have instead focused on how environments are constituted through movement. Laurier et al. (2016), for example, illustrate how walking practices (of turning, stopping, and pacing) are sequenced with displays of the map between members. The sequential resources of navigation are, therefore, organised within and through movement as one of these multimodal resources.

Object-centred sequences are omnipresent in interaction, and objects, inanimate or animate, are used as resources for interaction (Tuncer et al. 2019). How environmental objects are sequenced and ordered in the 'phenomenal field' (Merleau-Ponty 1962) is critical for the sequential organisation of wayfinding particularly. Laurier (2013) finds that, when driving cars, the noticing of features of close synchrony is similar to the turn-taking of conversation. An important finding of early studies of place descriptions and direction giving is how features are formulated by participants for the activity-at-hand, rather than necessarily being 'correct' formal descriptions (Schegloff 1972). Environmental objects are an important part of the sequential order of wayfinding, but exactly how they are relevant to, or sequenced in, navigation, is the product of the ongoing work of members: they are 'a constant practical realisation' (Haddington et al. 2013: 9). These ongoing realisations, however, may be the entirety of the journey, rather than located in immediately environmentally-relevant decisions. Fukuda and Burdelski (2019), for example, demonstrate how participants on guided tours do not only demonstrate understanding in the 'next turn' of conversation, they also link to discussions produced much further back in their tour. Epistemic stances, as displayed through object 'assessments', also topicalise environmental features as relevant to, and consequential for, the ongoing activity and projecting next likely actions (Goodwin and Goodwin 1992; Siitonen et al. 2019). How 'noticing', or 'comments' are initiated with relevance to the environment, and topicalise environmental features, remains an important topic, as in some studies target referents play a relatively minor role (Keevallik 2018). Later, we explore how unfolding ecologies over the duration of a journey play into the specific configuration of localised environments.

Research on navigation and map use predominantly featured urban settings (Bell et al. 2009; Laurier and Brown 2008; Laurier et al. 2016; Sarjakoski et al. 2012), and consider urban organisation: streets, built landmarks, often accompanied by written signage. Non-urban environments arguably have less distinguishable 'landmark' environmental resources than urban spaces, which are consequently less easily 'mapped', found, or followed. Early studies indicated how sequences of operations for travelling were linked to place items (Psathas 1986b), but assumed that such features, as described, were relatively uncontentious. This may be because streets are well-defined in urban settings, whereas paths in rural environments are typically less so (Lorimer and Lund 2008). Studies of environmental objects whilst walking focus on common urban features, and it is perhaps then unsurprising that doors, buildings, roads and streets are often seen as 'constraining' possible actions. By contrast, in forest environments, the level of wayfinding difficulty is often related to other kinds of complexities (Bjerva and Sigurjónsson 2017): the relevant object can be one of several similar candidates, and it can remain hidden before approached from certain directions. With respect to rural locations, there is a need to explore how environmental features affect the way in which mobility is done, as they offer different affordances and constraints compared to urban features.

3. Navigating and Orienteering: Methods and Data

The video data presented here were gathered by participants in competitive orienteering in Finland and the UK. In Finland, our data are taken from a 'sprint' orienteering event, organised over one evening in the Oulu region. The event is designed for all levels of skill, and there are four courses available, from a 2km course with nine control points, to a 5km course with 16

controls. The course takes place on the edge of an urban area, with characteristics of the suburban. The UK data is from a 'Mountain Marathon' event, a large-scale orienteering course over two days in mountainous terrain, with competitors camping overnight, and courses ranging from 20-45km per day. An important feature of both events is that control points could be approached from different directions, depending on competitor's route choices.

In Finland, video was shot with a handheld camera operated by a researcher, who shadowed pair of course-setters. In the UK, chest-mounted cameras were worn by participants, who worked in pairs. Both methods have benefits and limitations. In Finland, the handheld camera means that all participants are in shot, although audio quality could be compromised. In the UK, the on-body cameras enabled the researcher to be absent, however, footage is torso-directed. This visually intimate mode of recording provides one perspective on how participants direct their bodies and use gesture, but misses facial expressions and the direction of 'looking' for the camera-wearer.

In Finland, data were collected for a wider project, including a total of 4 hours 17 minutes of footage from orienteering events. The data covers five events from mainly the competitor's perspective, but the data analysed here includes a 35-minute sequence with two course-setters setting control points prior to one event. In the UK, data were collected with course-planners and course-checkers, from three groups of participants over two days. The footage was a total of 6 hours 50 minutes. The researchers watched through the footage to identify instances where navigation and/or environmental features became relevant. Fragments were selected, re-watched, and transcribed using a modified version of Mondada's (2016) conventions for multi-modal interaction (appendix 1). In analysing the materials we adopt an

ethnomethodological sensibility toward sequential and categorisational practices, rather than a specific doctrine of analytical method which risks the reification of sequence and category. In other words, our methods of analysis are themselves emergent from the settings analysed. Methods employed in the organisation of the practice are also the methods in and through which the practice is rendered accountable (Garfinkel, 1967). In this sense, the methods of categorisation and sequential organisation described below are part of the gestalt contexture of the activity (Watson, 2015). Ethnomethodology and conversation analysis serve, here at least, as place holders for the enterprise of describing members methods as accomplished-in-use.

We present two fragments here which illustrate some common, and some particular, problems for participants. Fragment 1 shows how identifying relevant features in the environment emerges gradually as a problem and how solving that problem is an ongoing accomplishment, involving course-setters switching between the perspectives of course-planners and route-followers. We have selected this fragment because the detailed and inference-rich orientation to the problem. Fragment 2 represents a common occurrence in our dataset: course-setter identifying a feature relevant to the progression of the course. This fragment stands out due to the course checkers finding the feature difficult to identify. This level of discussion only occurred twice in our dataset, yet participants identified it as common across their work, and for competitors. It is worth noting that the authors have what Garfinkel (2002) referred to as a 'vulgar competency' in orienteering: all three authors have participated in competitive events. This, according to Garfinkel, is important in ensuring that the analyst can view the practices 'from within' and, significantly, with the 'unique adequacy' of the methods participants themselves are using.

4. Analysis

Here we analyse two fragments where the work of placing a control point, or finding the way on the map, is evident in the practices of our participants. In fragment 1, we join Pirjo and Risto who, as course-setters, are placing a control in the orienteering course in Finland. This fragment gives us our first view of the difficulties of interpreting features between the map and the environment, as Pirjo and Risto attempt to get to grips with the 'planners perspective' in choosing a particular feature, a tree, for a control. Second, we join Gary and Jud who are acting as course-checkers, deciding where a control point should be placed, and at which feature. We see how Gary and Jud interrogate the perspective of a planner who previously designated the feature, and negotiate moving the control point to another location.

4.1 Three trees (Fragment 1)

Placing a control point for competitors to find might seem like a relatively simple task for those well-versed in map reading. However, as we demonstrate, a considerable amount of categorial inference-work is done by our two course-setters, as they discuss and organise the availability and intelligibility of possible 'orientable' features for competitors on behalf of the course-planners. In fragment 1, Pirjo and Risto, themselves experienced orienteers, are placing the course markers (a white-orange flag and numbered electronic tag) to prepare for competitors to run the course. Their task is to locate a control with a predetermined feature chosen by the course-planner as an 'orientable' object along the route. They are not supposed to assess nor change the location of the control point but rather just to place the flag correctly. They do this with the help of an orienteering map (scaled to 1:5,000) where the

relevant object is clearly coded on the map together with a course description. In this case the special feature to be marked with the control flag is a bush or a tree (marked with a green dot on a map: Figure 1).

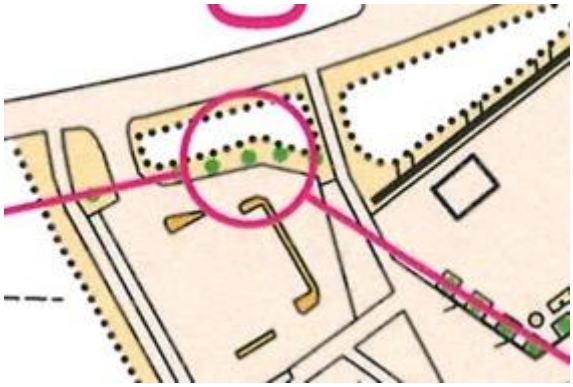

Figure 1: The feature to be marked as presented on the map.

Before fragment 1a starts, Risto and Pirjo have an estimation of where they are heading, but being mobile does not require intensive map-reading, and so they walk towards their approximate intended destination (we mark their position in fragments 1a-d). Having crossed a playground, a prior sequence of talk about attending another event comes to an end, and both start reading their maps while walking firmly forward.

Fragment 1a: Those trees

```
 01 Pirjo:  hei ↑tuolla on nuo     +%kolme (0.5) %puu::ta %puuta,
            hey over there are those three trees trees
            >>walks, looks ahead   +looks at map-->
   Risto    >>walks, looks at map[1]%looks ahead %looks up%looks at map-->

02 Pirjo:   joka on %°keskimmäinen niistä %kolmesta,°+
            which is the middle one of those three
                                                 -->+glances ahead-->
   Risto            %looks up and ahead   %looks at map-->
```

[1] Risto looks at the map

Pirjo summons (‘hei’) and makes explicit her observation on ‘those three trees’ ‘over there’ (line 1). The deictic formulation ‘over there’ is referring to the open environment in front of them and it is produced when Pirjo is looking forward, while a change in Pirjo’s gaze toward the map and the joint action of observing is balanced in her continuing reference to ‘those (rather than ‘these’) three trees’. While there are no definite nor indefinite articles in Finnish language, the use of demonstrative pronoun *nuo* (‘those’) match the observation with the map and expresses definiteness. Pirjo’s turn is not heard simply as a noticing of a random object (Keevallik 2018), but instead as an object relevantly tied their ongoing task of placing the course marker. Risto’s bodily actions align with Pirjo’s noticing: he looks ahead and then up at two tall trees before Pirjo has fully formulated the trees as the object she is referring to. Both parties therefore treat the category of trees as expected and projected objects for the task at hand. The grammatical realisation of Pirjo’s turn (line 1) starts with a declarative clause (‘there are those three’) and its phonetic qualities (higher pitch and stress in the word *tuolla*: ‘there’), show a level of certainty.

However, Pirjo returns to re-check the map while producing the word trees after some hesitation (line 1). She then continues with a more precise statement about the trees: she

finds out, while reading the map, that 'the middle one of those three' (line 2) is the object they should treat as relevant for placing the course marker. This turn-closing part is produced with a quieter voice compared to the turn-initial part as if partly withdrawing her original certainty. Risto does not respond but is simultaneously engaged in the same inference work based on his observations of map and the environment. While Pirjo's initial observation is not confirmed, it is not an obvious misalignment between the map and the environment in which they find themselves, in the sense that they would be lost (Laurier and Brown 2008), in which case we might see them come to a complete stop or doing a repair. Instead, they continue to walk forward whilst re-assessing the tree (fragment 1b).

Fragment 1b: Is it a tree?

```
03          (1.0)

04 Risto:   %+puuko se on,   %
            a tree it is?
            %looks ahead [2] %looks at map-->
   Pirjo     +looks at map-->

05          (1.1)

06 Risto:   se on tuo mänty tuossa,+
            it's that pine over there
   Pirjo                        -->+quick glance right-->
```

[2] Risto looks ahead

Risto's turn in line 4 seeks confirmation to Pirjo's claim: realised in interrogative form using the interrogative clitic *-ko* 'a tree it is?', Risto's turn can be heard as not proceeding with Pirjo's interpretation of the tree as the relevant object. There are many trees in view, including small deciduous trees in the car park, some larger pine trees to their right, and a range of smaller and larger pines up ahead. After a pause and a look down again at the map, Risto comes up with an aligning agreement by answering his own question: it is indeed a tree that they should be looking for (line 6). Furthermore, Risto's turn selects a category of the 'tree' category-device, 'a pine', and points out (although only verbally) a deictic object among other similar ones ('that…over there'). As the extract continues, we see that a full agreement is not yet reached.

Fragment 1c: Missing from the map?

```
07          (0.6)

08 Pirjo:   +nmmm
            hmm
            +looks at map, quick glances ahead -->

09          +(1.5)
   Pirjo    +walks slowly -->

10 Pirjo:   tota%,
            well
   Risto        %stops

11    (1.6)

12 Risto:   [%(se on kes- )]
           (it's the middle-)
            %walks fwd, looks at map and ahead-->

13 Pirjo:   [tästähän puuttuu% taas tästä kartasta +muutama (0.6) juttu
             tai,
            there are again some things missing from this map or
                                                  +glance right, then
           looks at map[3]
```

Risto %looks up, right and then at map

[3] Re-checking the map

Pirjo responds to Risto's suggestion with a neutral response token 'hmm' (line 8), and continues to consult her map as they walk, although at this point Pirjo's pace slows. Her well-prefaced turn in line 10, together with her change in walking tempo, indicate heightened uncertainty from that tentatively expressed earlier. Her return to look at the map, alternating with glancing ahead again, makes accountable to Risto that: (a) there is a problem aligning the map to the feature in question; and (b) that a solution to the uncertainty requires a further reading of the map. From this perspective, with the various trees ahead of them, it remains unclear which tree the course-planner wanted to use.

In light of Pirjo's hesitation, Risto is engaged in double-checking activity by re-reading the map and briefly stopping, responding to Pirjo's talk and slowing pace, and therefore treating her bodily display as consequential (Goodwin 2000a). The uncertainty is thus a joint accomplishment. Risto then initiates a turn (line 12), probably agreeing with Pirjo's earlier claim (line 2) that the correct feature is the tree located in the middle of the other trees. Risto is then cut off by Pirjo's overlapping turn (line 13). Pirjo's incomplete turn signals ongoing

uncertainty and possible misalignment between the map and the trees as the culprit. 'Things missing from this map' directs the complaint towards the course planner (who has drawn the map) while the inclusion of word 'again' and the clitic *-hän* frame her statement as recurrent and unsurprising (they had encountered a similar problem earlier), although the 'or' invites further possible explanations. Risto's attempt earlier to define the correct tree as 'that pine over there' is of no use either, as all the trees ahead are now pine trees.

Remember how the trees were marked with small green dots at the centre of the pink circle in Figure 1. From the perspective of the course-setters, in Figure 2, there are five trees, three smaller pine trees, and two much larger pine trees to the right. As Pirjo makes her incomplete turn, Risto looks up and right at the tall pines, then straight ahead at the smaller pines (line 13). It is this sequence of looking that seems to signal how the different sized pine trees may be the source of their trouble.

Figure 2: The five trees from Pirjo and Risto's perspective

In fragment 1d, we see how this trouble unravels, and is eventually resolved.

Fragment 1d: This Tree

14 (1.1)

15 Pirjo: eiku nuo on merkattu vissiin tuoho, eihän ne oo nämä.
no but those are probably marked there, those aren't these aren't they.

16 Risto: %+miksei näitä [puita %ole?
why aren't these trees (marked)?
%points right %looks at Pirjo-->
Pirjo +stops and read map[4] -->

17 Pirjo: [nyt pitää kyllä %kattoa,=eiku ne on muuten ne,
now I really need to look, no but they really are those ones

Risto -->%stops and reads map-->

18 (0.8)

[4] Pirjo stops to read her map

19 Pirjo: yks kaks kolmas tuoltapäin +ni sehän täytyy panna% tu:ohon.
one two third one from there so we need to place it over there
+walks fwd [5]
risto %walks slowly, looks at map and ahead -->

20 (1.6)

21 Pirjo: +eikö +nii:::n?
isn't that right?
+looks at Risto
+walks slowly -->

22 (3.4)

[5] Pirjo points and walks forward

```
23 Pirjo:   jos ajateltais että siin ois [ka-
            if we were thinking that there would be

24 Risto:                                   [%tähän puuhun,
                                              to this tree
                                            %points to a tree[6]-->

25 Pirjo:   +niin +tähän.
            yeah to this one
            +walks+points to same tree-->

26 Risto:   näin (niin se pitää olla,)
            yeah so it's got to be
```

[6] Risto points 'to this tree'

Back at line 13, in fragment 1c, Pirjo produced a possible reason for their problem: the map misses some relevant features, and she re-states the confusion between the trees in the

landscape and on the map at line 15. Risto makes a similar account of 'why aren't these trees marked' (line 16). Both can be heard as complaints on course-planners having done imprecise work, based on a misalignment between the domain of scrutiny and the map, and therefore the correct tree is not immediately and apparently available on their approach.

Rather than dwelling on the possible mis-mapping, Pirjo utilises a strategy commonly used by the competitors who find themselves in a similar situation – she halts the ongoing action and exclaims her willingness to re-read the map ('now I really need to look', line 17), communicating that a critical state of uncertainty has been reached. Pirjo finds out, on closer inspection, that all five visible trees are indeed mapped. Looking carefully at Figure 1, there are five trees on the map (Pirjo's 'those' and 'these' in line 15), but the first and fifth tree are partially obscured by the placing of the pink circle. The five trees on the map are represented by the same-sized green dot, yet the five trees in the environment are of different sizes, three small, and two fully-grown (Figure 2). It is perhaps no wonder that Pirjo and Risto have so much trouble working out which tree is which, and whether indeed all the trees have been marked or not. As Pirjo closely inspects the map, she appears to produce a partial solution: 'no but they really are those ones' (line 17), seemingly, on closer inspection, determining that the small trees are represented on the map, and that these trees are indeed their target.

In line 19, Pirjo's counting of trees produces a more certain, second-level alignment than her previous more general alignment to the trees. This certainty is also communicated to Risto by Pirjo re-starting her walk towards the 'right tree', and using the directive form 'we need to put it' (line 19). She also gazes at Risto as a way of inviting a response, which Risto does not produce immediately. Pirjo then produces a confirmatory question marker 'isn't that right?',

although an even longer pause follows from Risto (line 22). With no confirmatory response forthcoming, Pirjo is about to begin to further explicate her line of thinking ('if we were thinking that…'), but the turn is cut off by Risto, who points toward the same tree as Pirjo did and produces a confirmatory turn, 'to this tree' (line 24). Pirjo agrees (line 25) and Risto produces further confirmation (line 26). The tree is finally found, and the pair go on to place the marker (omitted for brevity).

In fragment 1 we begin to see the complex interplay between the categorial perspectives of course-planners and course-setters, the topicalisation of environmental features, and how displays of certainty and uncertainty can produce and resolve disjunctures between map and environment. Pirjo and Risto resolve map-environment misalignments through drawing on prior knowledge (Haddington and Keisanen 2009) of the formal properties of the map and what these features might 'look like' in the environment. Incorporated in this prior knowledge is an assumption that the course-planner will choose the most obvious feature in a particular zone of scrutiny (as Liberman (2013) also describes for occasioned maps). When this does not happen closer scrutiny is required, and the integrity of the map and, by implication the course-planners' perspectives, are called into question. Feature assessment is also important: the nature of the feature is itself topicalised, unlike when features are commented on to initiate some other talk (Keevallik 2018). The tree is topicalised from the current course-setters, and course-planners, perspectives, as tree size, position, and relationship to the map, are all relevant for the 'next' activity of placing the marker. The ambivalent nature of 'trees' is partly the source of the trouble, but also Pirjo and Risto topicalise the planner's perspective as problematic for *not* choosing the most obvious tree from *their* perspective.

We also see the dynamic relationship between certainty and uncertainty in locating natural features. As others have found (Brown and Laurier 2005a; Smith et al. 2020), a degree of certainty is maintained regarding the general direction of travel as Pirjo and Risto proceed. The eventual pauses and stops signal the emergence and upgrading of uncertainty, but this only occurs once the ambiguous features in question are proximate enough to visually scrutinise, sequenced alongside the trajectory towards an ultimate decision having to be made about where to place the control. Contrary to Liberman (2013), certainty is not eventually produced out of obligation to the course-planner, or the other course-setters present. Throughout fragment 1, therefore, degrees of certainty and uncertainty are produced, fleetingly and recurrently, in part used to recruit other members, such as when Pirjo uses upgraded displays of uncertainty to recruit Risto into solving the problem. In the next section, we see how displays of uncertainty more explicitly topicalise the planner's perspective, and the perspective of potential competitors.

4.2 The Boulders (Fragment 2)

In this fragment we follow two course-checkers who have a different task: to inspect the position of a control, but rather than place the final marker, they have the option of changing its position.

Gary and Jud are part of the course-planning and course-checking team. The course in the UK demands navigation across much longer distances than the Finnish course, and across mountainous terrain. Prior to Gary and Jud's arrival, another course-planner has set markers across the landscape (in the form of plastic white piping, or 'peg', hammered into the ground),

the position of which are marked on a 1:50,000 scale topographical map. Gary and Jud's task is to ensure that these checkpoints are suitably 'findable' for competitors, that they 'match' the location on the map and recorded GPS coordinates.

In fragment 2a, Gary and Jud are part way though their day-long journey, at the head of a valley, and approximately 1km away from their next control checkpoint. Before we join their conversation at line 1, they have already identified this valley as the correct valley to descend. The description for their next control reads: *Boulder*. The following conversation begins just as they start their descent.

Fragment 2a: Top of the valley

```
01    Gary  It'll be interesting finding this boulder
      jud   >>walking down slope-->

02    Jud   Huh-huh (chuckling)

03          (3.0)

04    jud   stops walking

05          (1.0)

06    Jud   Well I see a %candidate right down* (chuckles)
      jud                %points down slope [1]
      gary         >>stopped, looking at Jud   *looks down slope

07    Gary  huh (chuckles)

08    Jud   hu *huh-huh
      gary     *looks at map

09    Jud   It'd %better be a *big one when we get there
           %starts walking down slope-->>
      gary                                  *stops looking at map

10    Gary:       Yea
```


[1] Jud points to field of boulders

Gary's opening turn provides a two-fold topicalisation of the boulder as the relevant environmental feature, and the course-planner's perspective as a problem. That finding it will be 'interesting' can be read as a topicalisation of the planner's perspective as a source of likely problems ahead. Jud's second-pair part is a chuckle (line 2) which appears to indicate agreement with Jud's assessment, although it also responds to Jud's light tone which is not to take the problem too seriously for now.

Despite this initial treatment of uncertainty as low-stakes, the opening pair in talk is followed by a joint-stop. Stopping together is common amongst walkers encountering navigational troubles (Smith et al. 2020), and as we noted for Pirjo and Risto, joint-stopping might also indicate more serious trouble that requires checking the map. What is apparent from this position is that they are entering a landscape littered with boulders (Fragment 1a [1]). After a pause, Jud indicates a possible candidate boulder, pointing down the valley (line 6). Jud's 'I see' is notably not 'look', and his use of the term 'candidate' (rather than 'that'), does not appear to seek confirmation from Gary (and none is given). It is also 'right down' – which may be doing two things: confirming that they are travelling in the right direction, and that they will have to progress further to verify the candidate, acting as a proposal and recruitment for

a joint course of action of taking a closer look at the boulder (Couper-Kuhler 2014), which is relevant as they must stick together. Gary's response is again to chuckle, and Jud follows this with returned laughter (line 8), but Gary's chuckle does not immediately accept or reject Jud's proposal.

Whilst the initial stop did not immediately occasion checking the map, following this exchange Gary briefly looks down at his map, which suggests a more serious consideration of 'what next?' Jud, however, then begins to resume their walk, as he says: 'it'd better be a big one when we get there' (line 9), to which Gary replies with ambivalent agreement: 'yea'. Jud does not treat Gary's map inspection as critical: his walking away and statement about the boulder might be treated as an acceptance of Gary's earlier proposal which follows from the boulder being 'right down', and acts to close the conversation and the space to do navigational work. But in so doing, Gary's statement 'it'd better be a big one' raises the stakes in questioning the planner's perspective: from their current perspective, the specific boulder is not discernible, and that it ought to be so once they get closer.

The 'domain of scrutiny' (Goodwin 2003), for the course-checkers, is narrowed from orientating the pair down this valley, to the findability of a single boulder. When faced with a landscape filled with boulders, *the boulder* should be visibly distinct from the other boulders such that it is findable for route-followers. The description, *'Boulder'*, and the marking of boulders on UK ordnance survey maps (figure 3), may account for a range of features of different dimensions.

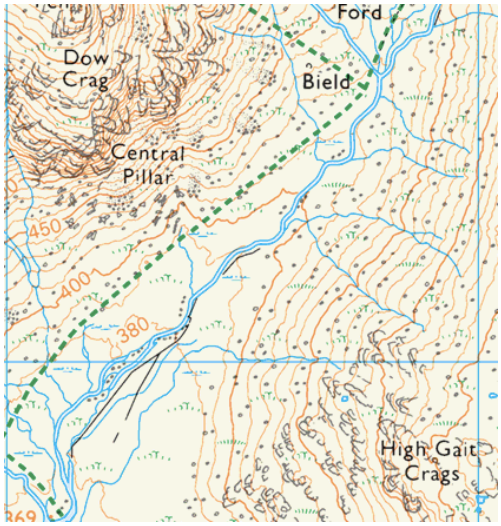

Figure 3: Boulders on a UK Ordnance Survey 1:25,000 scale map. Below 'Central Pillar' are clusters of boulders. Above and left of 'High Gait Crags' are scattered boulders. Contains OS data © Crown copyright and database rights 2021

Jud and Gary continue to descend the valley for twenty minutes. During this descent, they pause on several occasions to discuss the candidate. We re-join the pair, in fragment 2b, as Jud approaches his 'candidate', with Gary following just behind.

Fragment 2b: Inspecting the boulder

11	jud	walks toward boulder
12		(1.0)
13	jud	[1] places r hand on boulder, circumnavigates boulder [2]
14		(9.0)
15	gary	looks down [3] at Jud whilst traversing down hillside
	jud	tips left (look under boulder?) – continues around boulder
16		(2.0)
17	Jud	**Well he didn't do it with the white piping [4]**
18		(0.5)
19	jud	inspects gap
20		(2.0)

21 jud turn left – then right over boulder and faces Gary

[1] Jud places his hand on the candidate boulder and circumnavigates it. Note second large boulder (red circle); [2] Jud continues, Gary traverses the hillside; [3] Gary glances at Jud; [4] Jud completes inspection, peering into a gap.

In fragment 2b, Jud's inspection of the candidate identified previously demonstrates his commitment to this as the primary candidate, rather than other large boulders in the surrounds (Fragment 2b [1]). At line 17, Jud's 'Well he didn't do it with the white piping' makes accountable to Gary that the inspection was unsuccessful, whilst Gary walks past him down the slope. The course-planners perspective is again topicalised: either the white piping has not been well-placed, or the course planner has not chosen the most obvious boulder, but at line 21 Jud's commitment to his candidate has not been entirely dislodged – he remains standing next to the boulder. Gary's alternate trajectory, which 'breaks off' (de Stefani et al. 2013; Laurier and Brown 2008), from a previous configuration of following Jud, on the other hand, projects a different solution.

In fragment 2c, a lack of response from Gary leads Jud to re-open the query into the missing white piping by asking Gary (who carries a GPS device) about the GPS reading for their position:

Fragment 2c: The peg's there

```
22    Jud    So %what does *gis- Mr GPS say?
                %walks towards Gary-->
      gary   >>walking-----*points downhill (still walking)-->

23    Gary   There (0.2) the peg's there [1].

24    Jud       *What?*
      gary   -->*     *looks at Jud

25    Gary   *The peg's there [2]
             *looking down and points downhill, stops pointing,
              walking to Jud, looks at Jud [3]

26    Jud       %*No:o=
      jud    -->%stops by Gary and turns to look left
      gary        *stops walking
```

[1] Gary points to the peg; [2] Gary second point to peg and second large boulder; [3] Gary looks at Jud as the two come together walking to second boulder.

Jud's question: 'what does… Mr GPS say?', and his walk towards Gary performs two actions. He continues to attempt to recruit Gary into identifying his candidate, through requesting the GPS coordinate (which may identify his candidate as correct), but simultaneously by abandoning his boulder and walking towards Gary, he may also be showing a willingness to be recruited into Gary's alternative trajectory.

Ignoring Jud's question again, Gary identifies and points to 'the peg': 'There (0.2) the peg's there' ('peg' being an alternative description for 'white piping'). Jud's immediate reply: 'What?' (line 24), has a strong sense of surprise in its volume and tone. Gary repeats 'The peg's there', whilst doing a second point towards another large boulder, partially obscured from Jud's perspective by an undulation in the terrain. In doing so he treats Jud's 'What?' as

a problem of hearing this first utterance, initiating a repair. Jud's reply, 'No:o', (line 26), repeats his expression of surprise in tone, whilst also clarifying that the placement of the white piping Gary identified is a problem in itself (and therefore a questioning of the planners' choice), rather than his earlier turn of 'What?' being a problem of hearing. The pair perform a 'mobile reconfiguration' (Laurier et al. 2016), as they approach the boulders, split up, and rejoin, which in turn sequences different but parallel trajectories based on different assessments of the 'correct boulder' from alternate perspectives on the landscape. Gary's 'There (0.2) the peg's there' (line 23), might be marked as a turn that switches the focus of orientation between two semiotic resources (Goodwin 2000b). Both also stop their walking at this point, having come together side-by-side, further suggesting a break in their ongoing activity of approaching a 'correct' boulder. Joint-stopping, in this case, emerges from the identification of a problem still to be resolved.

In contrast to Pirjo and Risto, Gary and Jud can propose alternative checkpoint locations if they judge that chosen by the course-planner is inadequate. Jud's escalated dismissal of the second boulder is framed in this context, where the planner's rationality can be brought into question. In fragment 2d, we see how the pair progress after this shift in orientation to the second boulder.

Fragment 2d: That boulder?

27	Gary	**=(it's there on the ground)**
28	Jud	**No-*chts (.) so he's tagged that boulder?**
		*turns right and points down right [1]-->
29	Gary	**Yeah (1.5) *but, y' know**
	jud	-->*

30 Jud ***Hang on**
*rustling

31 Gary **there's one there**

32 Jud **D-no (.) *I'm going to go *over there (.5)**
*turns left *points [2]

33 Jud **and get a *picture of (.) [all the boulders**
*points down valley turning right and left [3]

34 Gary **[Yea**

35 Gary ***(I'll go see that)**
jud *looking left, zipper sound

36 Jud **Yea and *check that (.) is the GPS he's [done**
*turns and points down and right, then turns back left

37 **GARY** **[yea**

jud walks off left

[1] Jud points to the second boulder; [2] Jud points his left; [3] Jud points again to the second boulder.

Gary's response at line 27 might be a partial repair to Jud's 'No:o', clarifying that he can indeed see the peg 'on the ground'. Jud's reply produces a clearer rejection of the second boulder: 'so he's tagged that boulder', with the reference to 'he' explicitly remarking on the planner's perspective in choosing 'that' boulder over Jud's candidate. Gary does not concede immediately to Jud's analysis, instead, his turns ('yeah (1.5) but, y'know' and 'there's one there') signal that there are a range of adequate boulders in this perceptual field that are find-able for competitors, which might be read as a defence of the course-planners work and therefore resisting Jud's critical stance. Jud twice interrupts Gary's attempt to defend the adequacy of the second boulder ('Hang on' (line 22) and 'D-no' (line 32)). Jud's embodied response also signals his uncertainty over the second boulder: rather than inspect or move towards it as he did for to his first candidate, Jud widens the 'domain of scrutiny' again to 'all the boulders' (line 33).

This is the reverse of the move we observed earlier with Pirjo and Risto – rather than finally narrow their focus to a single feature, Jud, in his rejection of the second boulder, re-opens the boulder-filled landscape for inspection. Although Gary appears to mount a partial defence of the route planner's work, he also maintains his stance next to Jud (rather than, for instance, moving off towards his correctly identified boulder), offering some acceptance that a problem remains to be resolved. Jud's proposal to take a picture of 'all the boulders' could be providing an alternative course of action to view the boulder field from a different perspective, thereby determining how well the selected boulder 'stands out', and may also be to gather evidence to make the problem accountable to the course-planners, who will review photos and the positioning of control points at the end of each day. Jud's final request to 'check that (.) is the

GPS he's done' marks a second comment on the planner's rationality, to ensure that the GPS coordinates recorded match the peg placed on the ground. Although Jud and Gary appear to take partially competing stances to the adequacy of the marked boulder, they nonetheless collaborate to work at resolving the problem. Whilst Gary initially appeared to offer a defence of the course-planners work, at lines 34 and 37 his 'Yea' responses to Jud's proposals seem to acquiesce to Jud's attempt to challenge the course-planners work. Gary's incomplete '(I'll go see that)' also may be an offer to participate in efforts to resolve the situation. Jud's suggestion of gaining a new perspective on the boulder field compromises with Gary's stance, gathering evidence for further action rather than outright rejecting the second boulder.

Although thus far we have noted how the 'planner's perspective' is topicalised in the production of certainty and uncertainty when navigating and determining the status of environmental features, the initially competing perspectives of Gary and Jud reveals something of the route-followers, or competitors, perspective. Jud's rejection of the marked boulder is part of a sequential working though of what can be expected of competitors. This reading of the map and the terrain together views the context of the landscape in which the feature is perceived as critical – the feature is not perceived in isolation – simply identifying it (as boulder or tree) is not enough for competitors to logically progress. Gary and Jud's response to the two candidate boulders might be two different readings of competitor skill and competency. The assessment of features in the environment for the purposes of others doing wayfinding, is somewhat distinguishable from the assessment of urban landmarks for the purposes of those doing the wayfinding (Laurier and Brown 2008; Laurier 2016). Taking into account the 'find-ability' of environmental features not only requires the certainty of being in the right place being produced by co-present members, it also requires assessments

from the perspectives of non-present others (the course-planner's and the route-followers), which can produce uncertainties about the find-ability of environmental objects, rather than just uncertainties about 'being in the right place'.

5. Conclusions

In previous studies of walking and the use of maps in urban spaces, when noticeable features of the environment are referred to by members, their naming can have a degree certainty, such as street, road or shop names (Laurier et al. 2016). This is far from the case in rural spaces or with reference to 'natural' environmental features. A tree, or boulder, or indeed a rural path, may have a range of potential visual properties, such that their naming in talk might conjure perspectives on the object that can vary considerably. Is the tree a fully-grown pine, or a recently planted sapling? Is the boulder the most prominent boulder in the landscape – or not? Are things missing from the map on purpose – or maybe the very purpose of orienteering is to learn to cope with uncertainty (Bjerva and Sigurjónsson 2017)?

How landscape and environmental objects themselves feature in conversation is also significant. In other studies (Kääntä 2014; Keevallik 2018), environmental features as target referents play a minor role in subsequent interactions. In our data, the environmental object (trees or boulders) plays a continuing and central role in conversation and the ongoing task-at-hand, even if it is the planner's problematic choices that are initially topicalised. The adequacy of these nature-objects as perceived-by-others demands an assessment of them within their landscape context (other boulders and trees) and with assumed common perceptions of these nature-objects that others are likely to have (how *big* will they be?). The

central role of these objects in conversation is occasioned by the evolving certainties and uncertainties of their perception in landscape, as their revealing from different perspectives appears to occasion pausing, stopping and re-assessments of the correctness of direction and of the object itself. In this sense, the nature-objects under scrutiny here are not just 'noticed' as triggers to initiate talk (Keevallik 2018), nor straightforwardly 'remembered' from earlier encounters (Fukuda and Burdelski 2019), the boulders and trees are centrally the object under continual examination (Smith & Goodwin 2019), as is their contextual landscape.

Comparing our two examples, we see how the map operates differently as a 'work site' depending on the 'working conditions' of its users. Gary and Jud might be said to be working 'on the map', as they are able to move the control point to another location. This guides their assessment of the terrain and mapped features, their topicalisation of the 'planner's perspective' logics, and ultimately Jud's rejection of the boulder as a control point. In contrast, Pirjo and Risto are working 'off the map', as they must make the placement of their check point match 'as best as possible' to what is already mapped. Course planners, checkers and setters are therefore engaged in the continued production of the likely readings of the orderings of landscape as travelled through by others.

We have shown how the setting of an orienteering course is sequentially organised (with some similarities to previous studies of direction giving (Psathas 1986b)), and how the progressivity of a route is marked by particular sequential orders and categorial concerns. What we also show, however, is that the practices of route-setting and checking incorporate the possibilities of how others might travel through the landscape, and thus a range of possible sequential consequentialities for and in the following of the route and the finding of

the controls. The task, then, is not giving directions, but setting way-points such that they are discoverable for competitors, or route-followers, approaching from a range of possible directions. Therefore, in attempting to enrol the route-follower's perspective, they take account of a range of possible and projectionable sequences, which *may* be employed in the reading of the environment with the map. The reading of the map produced by the planners, and the environment in which they move, by the setters and checkers is thus a multi-layered matter which also projects into future engagements of others with the physical present in which the setting and checking is done.

In this sense, the reading of the environment is more than the immediate perceptual experience. It is the before and likely after journey to and from their present location, and a range of readings that examine other approaches to their location from the route-follower's perspective. Route-planning, setting, checking and following does not only therefore involve the co-presence of bodies in an immediate interactional space (Mondada 2009), but also assumed common-sense constructions of the possible perceptual fields of non-present co-participants. In this way, maps might be better understood as a technology that 'enable a shared ecological awareness' (Haddington et al. 2013: 43) allowing, through their stable features, the projectionability of future uses and possibilities. We noted earlier that Ingold's (2000; 2009) analyses somewhat divorced map-making, and navigating off maps, from the grounded work of wayfinding. Our two fragments illustrate how route creation and setting may not be so divorced from the environment, as the map is enrolled in creating, checking and re-working the environment as an environment for orienteering.

We propose to complement the insights presented here with a further analysis of how route-followers incorporate the planners' perspective and accomplish the orienteering landscape on the move. Beyond the detail of orienteering practices, we suggest that studies attending to instances of environmental map work that incorporate the possibilities of uses of future participants and users and their projected mobility practices – such as those found at the intersection of planning and design and construction of activity environments – will yield significant insights in to the practical accomplishment of rationalities and logics at play in members' treatments of the relationship between representation, space, and mobility practices.

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Appendices:

Table 1: Transcription Conventions used (adapted from Mondada 2016)

Symbol	Description
+ + % %	Gestures and descriptions of embodied actions are synchronised with corresponding talk to mark the start of the action. Where action has defined end-point the second symbol denotes the end of this action.
+-->	Action described continues across subsequent lines
>>	Action described begins before the except begins
(0.1)	Delay in seconds between talk
[ ]	Overlapping talk between participants
=	No gap between utterances
↑↓	Marks shifts in higher or lower pitch in utterance immediately after arrow
:::	Drawn out sound
-	Cut off prior word
[1]	Number corresponds with exact moment where screenshot taken