"I do it in my head and it is hard to explain": Issues around showing workings for one low attaining student in a GCSE resit classroom.

Rachel Helme

University of Bristol

The concept of 'mathematical identity' is described as saying and doing in the context of mathematics, however the interpretation of another's identity work is problematic due to the subjectivities of the observer. In foregrounding the participant's own voice, the opportunity is afforded to consider the work of identity from within the lived experience. This discussion focuses on the analysis of the narrative data of Darren, a participant from a study into the experiences of low attaining students in mathematics. Observations noted a contrast emerging between Darren's ability to correctly calculate an answer and his reluctance to record his workings. Introducing the Listening Guide as a method of analysis revealed the presence of two co-existing voices, the bravado of the 'action' voice contrasted with the more poignant voice of 'struggle', providing an insight into his internal quandary as he strives to explain his mathematical thinking.

Keywords: low prior attainment; identity; voice; the Listening Guide

Introduction

Bishop (2012) defines the concept of mathematical identity as self-concept in respect to the domain of mathematics, including "ways of talking, acting and being" (p.39). She goes on to state that these ideas are often tacit and hence it could be suggested that talking, acting, and being are overt enactments though which the working and reworking of identity can be inferred. However, I believe the interpretation of overt enactments of identity is problematic due to subjectivities and positioning by the observer and hence, attention should be given to the self-positioning voice (or co-existing voices) found in the participant's own stories. This discussion arises from a bid to foreground the voice of the participant in the meaning making regarding their enactments of identity, and hence consider the counter-narrative that may emerge. Below, I discuss the concept of voice within educational research and the complexities of identity work. I demonstrate the analysis of co-existing voices found in the interview data of a participant called Darren using an analysis process called the Listening Guide. Finally, I consider the counter narrative that emerges though giving attention to the self-positioning voice(s) of the participant.

The self-positioning voice and the work of identity

The term 'voice' is used within educational research to consider more than the sound produced but the discernments of attitudes and perspectives (McIntyre, Pedder, & Rudduck, 2005), by giving attention to "presence, power, and agency" (Cook-Sather, 2006, p.364). From a review of mathematics literature, voice has been discussed in relation to themes such as ethnicity, gender, disadvantage, and social class (see for example Hodge & Harris, 2015; Solomon, 2012; Civil & Planas, 2004; Hall, Towers,

& Martin, 2018), both by stating explicitly the silencing of particular groups within the classroom, as well as inferring silence through the use of language such as 'finding voice'. Bishop (2012) describes the work of mathematical identity as being both "individual and collective" (p.39), that is to suggest the self-positioning voice as an important factor in the understanding of identity work. I have argued previously that the low attaining student is discursively positioned in literature (Helme, 2019), however the voice of the student themselves is seemingly silent; that is the work of mathematical identity shared by low attaining students from their own lived experience is marginalised (Solomon, 2007). I suggest that to afford the opportunity to challenge a dominant discourse and develop a counter narrative for both researched and researcher (Fielding, 2004), attention should be given to the unacknowledged voice of the marginalised, thereby developing "new spaces of belongings" (Solomon, 2012, p.171). I argue that recognising the complexity of marginalised voice (or multiple co-existing voices) aligns with the appreciation of the (self)positioning work of mathematical identity (Hall, Towers, & Martin, 2018; Hodge & Harris, 2015) and hence should be centralised in studies that intend to present the work of mathematical identity in the context of low attainment.

Next, I introduce a student participant called Darren and demonstrate the application of a voice relational approach called the Listening Guide (Gillingham, Spencer, Weinberg, & Bertsch, 2006) in order to hear the co-existing voices within Darren's formal and informal narrative.

Analysing the voice(s) of a student participant

Darren

Darren was in his third year at the post-16 college and studying to reattempt his mathematics GCSE, having failed to achieve a grade 4 pass on previous occasions. (GCSE exams are taken aged 16 in the final year of secondary education and graded from 1 to 9 with grade 4 and above considered a pass, this aligns with the grade C and above using the previous G to A* grading system). The primary observation of Darren within the classroom suggested a confident student who often choose to complete the most challenging work available. He was willing to volunteer his answers during the teacher-led sessions and these answers were more often than not correct. In addition, I noted that he seemed to have his own methods of calculation that were not the same as the ones modelled by the teacher. However, Darren was positioned by the classroom teacher as a student who was not willing to show his written workings. The teacher went on to describe a conversation with Darren regarding the connection between workings and not achieving a grade 4 pass in his mathematics GCSE, stating:

> I said [to him]…when we get the exam papers back in January [after the November 2019 resit results] and if you haven't got your grade 4 I will know exactly why…because I know you can do it but you are not showing enough, you are not putting enough meat on the bone (teacher interview 6/11/19)

And again, in a classroom discussion, saying to Darren, "I know you say you will [include workings] in the exam, but people don't" (observation, 23/10/19).

However, through further observations, an inconsistency began to emerge around Darren's reluctance to record his mathematical thinking ('workings'). On the occasion that some workings were recorded, these were often in a different place on the page and therefore it was often difficult to follow his chain of thinking. Furthermore, the inconsistency came into sharper focus when Darren attempted to

verbalise a chain of thinking. Although there is evidence that, on occasion, he was able to describe the thinking behind his method, for example when finding the percentage of an amount without a calculator (observation, 04/12/19), this was not always the case. An example can be seen in the instance when he was trying to explain to me how he knew the answer to the calculation $140 \div 0.7$ as 200, stating "I know how I am doing it but if I have to put it in words I can't really explain it" (student interview 11/12/19). Darren's statement regarding his struggle to explain juxtaposes the teacher's positioning of lack of working as a result of laziness (teacher interview 6/11/19), that is if Darren was choosing not to (rather than unable to) record his workings it could be suggested that he would be able to verbalise his thinking. In line with meaning making as participant lead, the theme of issues around explaining and showing working became part of a semi-structured follow up interview with Darren, which was analysed for co-existing voices using the Listening Guide approach (Gillingham et al, 2006).

The Listening Guide analysis

The Listening Guide (Gillingham et al., 2006) is a voice-centred relational approach which focuses on the co-existing voices of the participant, by listening for the different ways they talk about themselves and the subject of conversation. The authors suggest that communication enables the inner, silent world to be made visible to others though the composition of the complexity of voice; that is understanding the meaning making process by following the lead of the participant and actively tuning into their polyphonic voice (Gillingham et al., 2006). There are four stages within the Listening Guide which each consider the narrative from a different point of view, namely Hearing the overall plot, Creating an I-poem, Listening for contrapuntal voices, and Composing the final analysis.

Stage 1: Hearing the overall plot

The first listening within the Listening Guide involves full, immersive reading of the transcript to allow the researcher to both consider the overall plot as presented by the participant, and to record their own listener response (Gillingham et al., 2006). The overall plot of Darren's work of identity is developed within the context of his past and present learning. Although there is some reference to other people in his educational experiences, for example his previous teacher or other students at school, the focus seems to be on his own actions. There is a narrative of accepting responsibility for previous perceived underperformances, as well as a realisation that he is the instigator of change in the present. In addition to the overall plot, Gillingham et al., (2006) suggest that recording the listener's response to the first listening explicitly acknowledges the subjectivities brought to the analysis process (see table 1)

> Rachel's response: I noted that there was a contrast in Darren's narrative with my own preconceptions as a (previous) secondary school mathematics teacher; that is that defiance was the reason a student demonstrated certain behaviours (for example, not showing workings). I began to consider whether lack of confidence could be presenting as a performativity of over confidence.

Table 1: Rachel's listener response to Darren's narrative data

Stage 2: Creating an I-Poem

The second listening of the Listening Guide involves creating an 'I-poem' formed by reflecting on the first-person voice of the participant, that is how do they talk about

themselves (Gillingham et al., 2006). This stage involves extracting the I statements from the narrative data, as well as the verb and additional words if relevant to the meaning. The I statements are arranged in the order that they stated in the narrative and then divided into stanzas in the form of poetry (hence the term I-poems) based on themes that emerge. For Darren, I titled the stanzas as *Responsibility I could have*, *Responsibility I did not*, *Explanation frustration*, *I need to, Pressures, Explanation revisited* and *I just need to*. However, there seems to be an intertwining of two different stories, namely that of 'control' and 'lack of control'. Within the Stanzas (1), (2), (4) and (7) Darren's voice is action focused and infers that success can be achieved (controlled) by choosing to act in a different manner, as can be seen in this extract:

> I think I need to
> if I get into the habit
> I will
> I just need to   (I-poem, stanza 7, lines 3-6)

However, Darren is also reflective:

> I hated it
> I wasn't that good
> I didn't really try   (I-poem, stanza 2, lines 1-3)

This extract demonstrates Darren's work of identity emerging within the interview process itself.

However, there is a second story that emerges from stanzas (3), (5) and (6) where Darren's voice seems to describe an inner struggle with challenges that he feels are not under his control as can be seen in this example:

> I know how I am doing it
> if I have to
> I can't really explain (I-poem, stanza 6, lines 9-11)

This extract suggests that he has his own understanding, but feels he cannot articulate it, either verbally or in written form, in fact he laments: "I feel like all my knowledge goes out the window" (student interview 11/12/19). There is a sense of something intangible that he is unable to capture and put down on paper.

Stage 3: Listening for contrapuntal voices

The third listening brings the analysis back into relationship with the research question and considers the contrapuntal or co-existing voices present in the narrative. Gillingham et al. (2006) compare this stage to counterpoint, which is a reference to the two or more melodic lines present in a piece of music. The authors go on to say that the researcher should read and re-read the narrative data multiple times, giving attention to a different voice on each occasion. It is necessary within this stage to both specify the voices and define how they can be recognised. For Darren, the two contrasting voices continue to emerge from within the narrative, namely that of the action voice and the struggle voice. Firstly, the action voice uses the phase 'I need to' and gives the sense of something required. The voice describes a situation where Darren states he either acted or needs to act in a certain way, for example "I didn't do any work" and "I need to start doing [workings] in exams" (student interview 11/12/19). On occasion the action voice considers solutions in the relationship between 'needed doings' to 'future doings', as can be seen in this example:

> I think I need to start doing [workings] in exams but if I get into the habit of doing
> it in class, I will do it in the exams (student interview 11/12/19)

That is to suggest that the decision to start acting in a different manner will lead to the desired resulting action (in this case showing working), with the only barrier being the current non action.

However, in contrast the struggle voice uses the phrase 'I have to' and gives the sense of something imposed. This voice considers the contemplations of Darren as he wrestles with the problem of having to show workings stating that "I know how I am doing [the work]" but "it is difficult/tricky/hard to explain" (student interview 11/12/19). For this voice, the knowing of being able to calculate the correct answer does not lead to the doing of showing workings, stating, "I have to write it down and I get confused" (student interview 11/12/19). However, in contrast to the action voice, the struggle voice does not consider future possibilities, that is it does not seem to attempt to present any solution to the stated difficulties. It could be suggested that although Darren is aware of the struggle, he has not definitively described what the barriers may be and therefore cannot consider possible solutions. It is interesting to note that the struggle voice is nested within Darren's action narrative, that is the interview data both begins and ends using the voice of action.

Stage 4: Composing the final analysis

The last stage of the Listening Guide composes the final analysis by synthesizing all that has been learnt about the participant in the previous three listening stages, thereby recognising the complexity of the lived experience (Gillingham et al., 2006). For Darren, the narrative is highly reflective and presents a dominant theme of accepting personal responsibility when it comes to past, present, and future outcomes. There is a sense of being in control of overt actions and recognising the impact of the personal decisions that have led to the actions, hence the voice of action is prominent. This voice suggests that 'doing' is the means to improve his future situation stating, "if I just get into the habit of doing [workings] in class, I will do it in the exams" (student interview 11/12/19). The action voice focuses on Darren's own action and does not consider the impact of the actions of others within his learning environment; however, this voice does seem to align with the classroom teacher positioning of lack of working as a result of laziness suggesting that Darren is in part speaking though the words of others (teacher interview 6/11/19).

However, juxtaposed against the voice of action, and the positioning by the teacher, is the voice of struggle that presents an alternative mathematical story regarding past, present and future outcomes. The voice of struggle describes internal discourses around lack of control, "all my knowledge goes out the window" (student interview 11/12/19) and low confidence, "I start questioning [the answer] if it is right" (student interview 11/12/19). In addition, the internal dialogue goes on to influence overt actions:

> I do it in my head … I know how I am doing [the workings] but it is tricky to explain ... [so] I just leave it, at least I know how I am doing it, but in the exam I need to get those marks and so I need to write it down. (student interview 11/12/19)

Here the voice of struggle presents a dilemma that the voice of action cannot resolve. Darren is unable to articulate his mathematical thinking and therefore chooses not to present working, however this contradicts with the need to gain marks for working out in the exam. The question that remains unresolved is how can the voice of action suggest that "I just need to start doing it" when the voice of struggle states that "it is difficult to explain"?

Final thoughts

The use of the Listening Guide as a process of analysis within this small-scale study brought into focus the counter-narrative that this participant, although presenting as confident in lessons, was having difficulties in articulating his thinking and therefore for this reason had chosen not to attempt to record his working. The multiple listenings has enabled a distinction to be made between the bravado of the action voice, which it could be suggested is the re-voicing of his teacher, and the poignancy of the internal struggle voice. Further research should consider how the co-existing voices found in narrative can challenge marginalisation and create new spaces of belonging (Solomon, 2012) for participants in the context of low attainment in mathematics.

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