

# From Emo to Ratio: Exploratory Talk as a Need for Group Efficacy

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## **Abstract**

The concept of 'exploratory talk for learning' in education, as described and defined by British educationalists and researchers more than twenty years ago, has long been uncharted territory in Flanders, the Flemish part of Belgium. A 2018 PhD study on learning outcomes of exploratory talk in five Flemish primary schools has changed this. During this interventional study target groups were taught the ground rules of exploratory talk and made to put these into practice for eight consecutive weeks. Pre and post tests included measurement of reasoning and problem solving skills. The results confirm earlier research: pupils improved their reasoning and problem solving skills at group level significantly, the latter also at individual level. Simultaneously, the occurrence of – more emotion induced – disputational talk diminished. Further analyses at the individual level demonstrate that pupils with strong mathematics skills make significantly more progress in the use of key words in context, one of the indicators of exploratory talk.

## **Conference Paper**

### **1. Context and rationale**

Inspiring constructivist theory, the Russian educational psychologist Vygotsky (1978) has highlighted the importance of language and interaction for learning in a very clear way. Language is not just a knowledge transfer vehicle, it is a means for learning. However, international research shows that in practice pupils have little opportunity to use language for learning (Hoetker, 1968 Flanders, 1970; Sinclair & Coulthard, 1975; Burns & Myhill, 2004; English et al. 2002; Eke & Lee, 2008). In the classroom, language use is highly centralized and teacher-controlled, and non-adapted language use by teachers may even cause additional learning problems for pupils. Over the years, Dutch and Flemish research has come to similar conclusions (Van der Aalsvoort & Van der Leeuw, 1992; Geudens & Rymenans, 1992, Van Gelderen, 1994; Bossaert & Lutjeharms, 2009; Van Gorp, 2010).

Considering interaction is a key element in learning, collaborative activities like group work provide opportunities for teachers to pursue both curriculum goals and language goals. According to Mercer and Littleton (2007), however, the quality of talk in group work does little to promote learning: group work talk among pupils is rather disputational (each pupil wants to be in his or her own right) and/or cumulative (the pupils do not discuss matters with a critical mind and choose the easy way to get things done). Even among adult learners such low quality talk is far from exceptional. Therefore, teachers need to organise group work in such a way that pupils use exploratory talk for learning (Mercer & Littleton, 2007).

Exploratory talk is “the kind of talk in which partners engage critically but constructively with each other's ideas. Statements and suggestions are offered for joint consideration. These may be challenged and counter-challenged, but challenges are justified and alternative hypotheses are offered. Compared with the other two types, in exploratory talk knowledge is made more publicly accountable and reasoning is more visible in the talk” (Wegerif & Mercer, 1997:53). Exploratory talk has typical linguistic features: what- and why-questions, positive feedback such as ‘that’s a good suggestion’ or ‘you are right’, utterances like ‘I agree/disagree because’, ‘I think’, ‘I wonder why’ and consensus seeking statements such as ‘So, can we agree on the fact that ...’ etc. Exploratory talk allows pupils to formulate their thoughts and arguments, which also improves their problem solving skills. As it stimulates pupils to approach subject matters more rationally, ratio rather than emotional impulse takes the upper hand in conversations. But pupils are not born with exploratory talking skills, nor do they learn them at home. They need to learn them at school (Mercer, 2010).

In Flanders, the Dutch speaking community of Belgium, exploratory talk has been uncharted territory for decades. Similarly, there has been a lack of interest in the study of speaking and listening skills, as is illustrated by Hooegeveen and Bonset (1998), Bonset and Braaksma (2008) and Bonset and Hooegeveen (2011) who found only a handful of studies on speaking and listening skills between 1969 and 1997, and as good as none between 1997 and 2008. Flemish curricula, school books and publications, as well as teacher educators, do promote collaborative activities in the classroom, but as far as group work is concerned, most focus on organisation and structure, on the allocation of duties and on ideas for assignments. Conversational nature, needs and requirements are either neglected or not dealt with systematically, let alone based on a scientifically sound frame of reference. Hence, Flemish or Dutch publications which focus on exploratory talk for learning at school are hardly to be found (T'Sas, 2013). Filling this gap was one of the main reasons for the current study;

In order to measure learning effects of exploratory talk in pupil-pupil conversations, Wegerif and Mercer (1997), Rupert Wegerif, Mercer, and Dawes (1999), Rojas-Drummond and Mercer (2003), Rojas-Drummond and Zapata (2004), Rojas-Drummond, Mazon, Fernandez, and Wegerif (2006) and other researchers set up various empirical experiments in which target groups were first taught the basic principles (ground rules) of exploratory talk via basic lessons, while control groups did regular group work without the exploratory dimension. After the basic lessons followed a usually extended period of regular and systematic collaborative activities (group work) during which feedback and feed forward reflection stimulated pupils to master exploratory talk and apply it to different school subjects, mostly science and mathematics. Pre- and post-testing was organised to determine learning effects, often including measurements of the development of problem solving skills.

As no such research had ever been done in the Flemish education context, an extended replicator research was performed in order to widen insights and to generalize the effects of exploratory talk. Therefore, the following research questions were answered:

- RQ 1. What is exploratory talk, how is it measured and which effects does it have?
- RQ 2. To what extent do pupils of the third level (primary school) use exploratory talk in group assignments?
- RQ 3. To what extent do pupils use exploratory talk after a 12 week training?
- RQ 4. What effects does the use of exploratory talk have on pupils' problem solving skills at group and at an individual level?

## 2. Methodology

In order to answer the first research question an extensive literature study was performed, the results of which we will not discuss into detail, as they fall mostly beyond the scope of this congress. Based on this literature study and on Mercer's (1999) original study, a quasi-experiment was executed with pre- and post-testing in primary schools, followed by qualitative and quantitative discourse analysis. For data analysis we also added parameters of a Rojas-Drummond et al. (2004) study.

The quasi-experiment involved five Antwerp primary schools, totaling 11 classes, 11 teachers and 163 unique pupils. A pilot study (one class) preceded the main study (ten classes) for which five control and five target groups of 5th and 6th form (11- and 12-year old) pupils were defined. In each class the experiment took 14 weeks, including two weeks for pre- and post-testing. In the target groups the five basic lessons took four weeks and were followed by eight weeks of group work. In the control groups the experiment took 14 weeks as well: two weeks for pre- and post-testing and 12 weeks for regular group work.

During the experiment pupils of all classes were divided into triads by the teachers. In each class three triads were closely examined, totaling 15 in the control group and 15 in the target group: of every group work at least ten minutes were devoted to conversation, with minimal interruption by the teacher. These conversations were video and audio recorded, and transcribed. All pupils took part in all classroom activities, including pre- and post-testing.

As in Mercer's (1999) study, control groups were not taught exploratory talk but immediately started doing group work, at least twice a week. Target groups first learnt the ground rules of exploratory talk via five basic lessons. These lessons were given by the teachers who had previously been introduced to the matter and trained for classroom practice. The lessons were adaptations of those described in Mercer and Littleton (2007). Every lesson consisted of practical assignments for which pupils had to work together in groups, of whole-class moments, and of feedback and feed forward reflections. After these basic lessons the children worked in triads at least twice a week, including reflective activities about their progress in handling the ground rules.

Pre- and post-testing was organised in two ways: one was a group discussion about a non-curricular topic. The other was a problem solving test (Raven's Progressive Matrices, Standard and Adapted Coloured version; (Raven, 2003) which was taken both in groups and individually. Each test was divided into two parts of equal difficulty (30 puzzles), one for pre-testing, the other for post-testing.

Conversations were transcribed verbatim and stored for qualitative and quantitative analysis. All pre- and post-test conversations at group level were analysed, i.e. the non-curricular discussion and the problem solving test. Analysis comprised four indicators of exploratory talk: the use of key words in context, turn-taking, long utterances and the number and quality of arguments. We hypothesised that pupils would significantly use more key words in context in the post-test. Also, turn-taking would be more democratic, utterances would be longer as pupils would elaborate more on claims they made and the quantity and quality of arguments would augment. This would mean exploratory talk is both 'teachable' and 'learnable'. As an additional learning effect both the group and individual scores on Raven's would be significantly higher after the intervention, which means they would have increased their problem solving skills. Finally, we investigated the influence of certain independent variables on the use of key words in context at an individual level. Literature and previous research suggest possible influences of gender, socioeconomic status (referred to as GOK in this study) and mathematics skills. To this we added language skills, though due to a lack of background information this had to be restricted to only one aspect, i.e. spelling skills.

For the analysis of our data we employed the sociocultural approach (Mercer, 1997), which combines quantitative and qualitative methods. We used concordancer software to count all key words for exploratory talk that appeared in the conversations. These are words and word groups like 'I think', 'agreed', 'Why?', 'Because...', 'Would you...', etc, which were categorised based on their primary use in

the ground rules, for which we used the framework presented by Rojas-Drummond and Zapata (2004). Because a rude count of these key words is not sufficient (pupils use them outside an exploratory context as well), qualitative analysis was done to determine whether these key words were used in the proper – exploratory – context, hence ‘key words in context’. Key words that were not used in context were marked and left out of statistical analysis. Qualitative analysis also revealed the use of key words we had not anticipated on, e.g. ‘Wait’ to express a thinking process. These key words were, in turn, quantitatively analysed on their occurrence.

In order to collect information about turn-taking and long utterances, all relevant conversations were processed in a spreadsheet programme which was also used to determine and count the use of key words in context at an individual level. Information about the number and quality of arguments was obtained by analysing each conversation qualitatively. This was done separately by two researchers who discussed the quality of arguments in order to reach agreement. All results were processed with a spreadsheet programme.

Finally, statistical analyses were performed to generate frequency tables, find significant correlations and causal relationships, and to determine the influence of the independent variables on the use of key words in context.

### 3. Results

Literature shows that measuring exploratory talk is a quite complex matter and due to a lack of benchmarks it is not easy to answer the question to what extent a conversation as a whole is exploratory or not. We did not find any study which puts out marks on a continuum before or after which a conversation can be labelled exploratory, cumulative or disputational, based on one criterion or the other. Nevertheless, it is plausible to assume that conversations which contain a lot of key words in context will be more exploratory than conversations which contain few or none (Mercer, 1995; Wegerif & Mercer, 1997; Mercer et al., 1999; etc), and – a fortiori – when conditions regarding the three other indicators are fulfilled as well.

We will now discuss each indicator in more detail and include points of view found in our literature study.

#### 3.1 Key words in context

On average, especially in the problem solving discussions, the triads of the target groups used significantly more key words in the required exploratory context than before the intervention, while the control groups made little or no progress. The difference is also significant when comparing the number of key words in context of the target group with those of the control group. This is comparable to the findings of Wegerif et al. (1999) who saw all key features of exploratory talk increase significantly after their intervention in the target group.

#### 3.2 Turn-taking

Turn-taking became more democratic during the non-curricular discussion in the target group, though not for all triads. Interactive dominance/recession did not change either, though it involved only few triads. No changes were seen in the control group. In the problem solving discussion the target group showed more quantitative symmetry after the intervention, and again there was no change in the control group. It appears that the intervention has caused some positive effects. As Mercer and Littleton (2007) stipulate, without a training in exploratory talk pupils tend to use disputational and/or cumulative talk. Characteristics of disputational talk are that pupils do not really listen to one another and interrupt each other, which results in more quantitative asymmetry. Our data confirm this postulate only partially, but then perhaps the margin we used to determine symmetry was too small.

#### 3.3 Long utterances

The intervention had a positive effect on the target groups, especially during the problem solving discussion. Progress was less outspoken in the non-curricular discussions, but still positive. Simultaneously, there was no progress in the control groups. We conclude that target pupils have learnt to elaborate more while control pupils have not.

### 3.4 Arguments

Similar positive results show for the non-curricular discussion. Nothing much changed in the control groups, but in the target groups the average number of arguments increased. All triads of the target groups made progress, though not to the same extent. In the problem solving discussion the average number of arguments was considerably higher than in the non-curricular discussion. This was found in both tests. This not illogical, as the number of issues to discuss and solve in Raven's was much larger than the number of discussion topics in the non-curricular discussion.

As we hypothesised, the quality of arguments during the non-curricular discussion did not augment in the control groups, while it did in the target groups. Results are in line with the scores for the quantity of arguments, but again not all triads started and evolved at the same rate and pace. Like in the pilot study we noticed that the quality of arguments was higher during the non-curricular discussion than during the problem solving discussion: while explicit and semi-explicit arguments were more dominant in the non-curricular discussions, rudimentary and implicit arguments dominated the problem solving discussions. Again the explanation is to be found in the presence respectively the absence of lesson materials. Whenever materials are used, like in the problem solving discussion, pupils' arguments show more signaling words and deixis, generating more implicit language. Nevertheless, our figures show that even then, the target group triads raised not only the quantity but also the quality of their arguments while doing Raven's, whereas the control group did not.

### 3.5 Problem solving skills

As mentioned before, we used Raven's Standard Progressive Matrices to measure the pupils' problem solving skills at group level. The target group increased its score after the intervention significantly. The control groups score also improved but the difference with the pre-test scores was not significant. Progress of individual pupils was also significant in the target group, which proves the Vygotsky-based hypothesis that social learning induces individual learning. In the control group nearly similar progress was found, but this turned out not to be significant. Further analysis revealed strong differences between schools.

## 4. Conclusions

The results of our study made clear that exploratory talk can be taught/learned and if pupils make use of it consistently, they use language in such a way that they learn more from one another and improve group reasoning. Direct observed effects are that pupils increase their argumentation skills, work better together as they master the ground rules and increase their problem solving ability at group and individual level. Simultaneously problem solving skills improved at group and at individual level, which confirms Vygotsky's claim that social learning precedes individual learning. This way, exploratory talk indeed reflects an educationally effective intellectual activity, a social mode of thinking (Mercer, 1996, 2004). The findings of our empirical study are confirmed by earlier research (Mercer, 1996; Wegerif, 1996; Wegerif & Mercer, 1997; Mercer et al., 1999; Rojas-Drummond & Zapata, 2004; Mercer & Sams, 2006 etc.).

## 5. Some thoughts about emotions

This congress focuses on language and emotion. The focus of our study was language and learning, and did not include analyses of emotion. This made us wonder to what extent emotion is studied in research on exploratory talk. For that purpose we re-analysed some of our data. Our research included an analysis of 115 articles on exploratory talk for learning. We used a coding scheme including nodes like 'ground rules', 'transfer', 'role of the teacher' etc. For the purpose of this congress, we added 'emotion', 'feeling', 'attitude' and 'affect' to the coding scheme. The results were rather poor. A few exceptions notwithstanding (e.g. Polo et al., 2015), most studies on exploratory talk do not discuss emotion to a great extent either. But this does not mean that nothing can be said about emotion when studying the language pupils use during collaborative activities.

We know that the types of group talk we discussed – cumulative, disputational and exploratory talk – each imply specific politeness rules or face-preservation systems (Polo et al., 2017), which determine the way group members experience and form their identity.

In cumulative talk critical thinking as invoked by why-questions, challenges and counterarguments, is utterly avoided in order to preserve a positive group atmosphere and maintain individual “face preservation through agreement” (Polo et al., 2017:313). The underlying attitude is that there can be no room for emotions like fear (for being criticised), shame (for suggesting an idea which might be considered stupid), anxiety (for not being able to make one’s point) etc. Trust, respect, social recognition etc. are to guarantee individual face preservation. This is one of the reasons why this type of talk often lacks (elaborated) argument-building and linguistic markers like ‘Why?’, ‘but...’, ‘I don’t agree...’, ‘Wouldn’t we better...’ etc. And thus, because the focus on unquestioned individual identity and face preservation is so strong, cumulative group talk often results in low quality output.

In disputational talk, which is usually marked by strong disagreement, group members want to ‘win the conversation’ and will rather employ more aggressive strategies to preserve their face: group members interrupt one another, try to dominate the discussion and go through a lot of trouble to impose their personal opinions while closing the door for any counterarguments. Talk is all but consensus-driven and, like cumulative talk, leads to low quality output. Correlated emotions are anxiety and anger (e.g. feeling offended by criticism), jealousy and envy (e.g. because one of the other group members is getting the upper hand), the zest for personal triumph etc. Linguistic markers like ‘no’, ‘You’re wrong’, ‘but’, ‘I don’t agree’ are typical for this type of conversation, as are short sentences and non-democratic turn-taking.

The emotions related to both cumulative and disputation are liable to threaten group achievement. Especially, “negative emotions affect motivation and self or group efficacy” (Polo et al. 2017: 306). In exploratory talk, however, ground rules even the path for more rational discussion and for a shift from individual identity to group identity (Wegerif & Mercer, 1997). Talk becomes task- or issue-driven instead of ego-driven. Actually, pupils are taught that changing ones mind of asking why-questions is a justified means to jointly come to deeper understanding or solving problems. In the footings of our study, as the experiment proceeded, we saw pupils gradually calm down and show more respect for each other’s ideas. There was less anxiety, less anger, less envy and it appeared that they all felt more safe. At the same time, as mentioned before, transcripts showed more indicators of exploratory talk, i.e. more critical thinking and more argument-building.

We argue that the pupils first considered the ground rules as a kind of external authority which allowed them to be critical, vulnerable, doubtful ... In other words, the ground rules helped them preserve their face. In the transcripts of our study, for instance, especially those of the first weeks of our experiment, we regularly found expressions like ‘No wait, first we all have to agree on this, before moving on to the next question’ or ‘It is X’s turn to speak now’ or even ‘Why can X not disagree with what you said?’ Later, after the pupils had internalised the ground rules, such self-regulating interventions seemed less necessary, as explorative talk became an automated group strategy, marked by positive emotions like trust, respect, openness etc. We found confirmation of this emotional shift in other studies on exploratory talk for learning (Topping and Trickey (2014), Rupert Wegerif, Littleton, and Jones (1997), Luby (Luby, 2014; Mannion & Mercer, 2016; Murphy, 2015).

Based on all this, it would be tempting to conclude that exploratory talk reduces (negative) emotions in talk. But reduction does not mean annihilation, as this might prove counter productive: “Emotions are resources that people use to argue, and seek to understand how they are employed in the construction of arguments” (Polo et al., 2017:304). Moreover, shifts to disputational or cumulative talk, including their emotional characteristics, may even be necessary to get ‘the exploratory train’ going again (Tin, 2003). Group discussions are almost inevitably characterized by social and emotional tensions when disagreement sets in. Exploratory talk does not take away these tensions but helps to channel them and turn them into constructive thinking. The role of emotion lay beyond the scope of our study, but as learning has an important affective component, we believe it would be very useful to include it in future research on exploratory talk. Cognition is not emotionless.

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### **Bio data**

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