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INSIDE TEAMS^{3D} (IT^{3D}) – Development of a multi-dimensional interaction coding system

Amélie Théry and Michel Verstraeten

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Keywords: group dynamics; interaction coding system; INSIDE TEAMS^{3D}; dimensions; reliability; validity.

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Abstract

The analysis of group dynamics has become a major challenge to capture parameters of collective work such as conflict, performance or team member satisfaction. To date, many interaction coding systems have been developed to help identify types of interactions among group members, but some shortcomings involving their structure, complexity and reliability remain. In this paper, we present the INSIDE TEAMS^{3D} (IT^{3D}), a new coding system dedicated to the study of verbal interactions in small groups and developed iteratively from varied group experiences. Its creation focuses on some significant requirements such as the user-friendliness of the system, the exhaustiveness of its categories, and the multidimensional essence of interactions. Thus, the IT^{3D} takes account of three dimensions of individual behaviours which are the functional meaning of interactions, the convergence among interactions and the interpersonal emotional meaning of interactions. It hence provides a bigger picture on different aspects of group dynamics. Intercoder reliability and validity are also ascertained. Such a tool contributes to opening up new research and practical opportunities to a greater understanding of intragroup phenomena.

KEYWORDS: group dynamics; interaction coding system; INSIDE TEAMS^{3D}; dimensions; reliability; validity

1 Introduction

Understanding group dynamics has been a rather complex issue at the heart of many researches for almost six decades. One interesting way to figure out behaviours within groups is to focus on interactions among team members. If we consider the interaction types as "fundamental particles" of collective processes, the ability to identify them and consequently, to code them and see the way they combine with each other becomes an invaluable tool to obtain a better knowledge of how the group works. To make this observation possible, a number of coding systems meant to highlight and analyse interactions patterns emerged, with varied aims and perspectives (Théry, 2018).

Although interaction coding systems have aroused higher interest since their creation in the late 1940s, some major limitations have restricted their use and led to a deceleration in the field of interaction analysis (Schermuly & Scholl, 2012; Théry, 2018). Some structural flaws

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call into question the exhaustiveness of coding categories, especially for task-oriented behaviours including socio-emotional aspects. Then, the usability of coding systems turns out to be quite hazardous given the complexity of the classification, the training time to reach proficiency and situations where choices among categories are left at the sole discretion of the coder. This contradicts the importance of user-friendliness and greatest objectivity when coding group interactions. Finally, few coding systems offer reliability and validity measures, even if it would bring credibility to ensure they are appropriate to study group dynamics (Poole & Hewes, 2016, to be published).

In the light of the above limitations, this paper presents a new multidimensional coding system appropriate for all group meeting contexts and called INSIDE TEAMS^{3D} (IT^{3D}). Our aim was mainly to enable an exhaustive coding of group verbal interactions with a user-friendly coding system that could be easily used for live coding e.g. for team coaching. The IT^{3D} was then designed with the following specifications in mind: a) it should be exhaustive, b) it should be easy to assimilate and offer an easy use under real-time conditions after a short training course, and c) its categorisation has to be precise and unambiguous in order to provide a framework to the coder. Firstly, we detail the construction of the IT^{3D} in line with these specifications. Secondly, we widely present its structure and content. Thirdly, we give advice for use of the IT^{3D}. Finally, we establish intercoder reliability and validity of the system. We conclude by offering perspectives for future research based on this model.

2 Construction of the coding system

To favour user-friendliness of the coding system and its possible use in real-time situations, we made various choices. Firstly, the IT^{3D} is intended to give a general overview of the kinds of interactions occurring in groups, but not to include too specific categories. Consequently, we decided to limit the number of categories included in the system to provide a sufficient intermediate level of precision, but ensuring exhaustiveness anyway. Out of the same concern of live coding, the IT^{3D} mentions the speaker but does not track the recipient of the interaction or the relationships among team members (e.g. hierarchical relationships). Likewise, duration or temporal sequencing of interactions are not reported.

The IT^{3D} does not consider the effect of interactions on a member or the group (e.g. creation of a good atmosphere) or intentionality behind interactions (e.g. commitment to strengthen the group). Nonverbal behaviour (e.g. tone) is not intended to be coded per se, but is taken into account to understand the functional meaning of ambiguous verbal interactions and provide information on their interpersonal emotional meaning (Fisher, Drecksel, & Werbel, 1979).

2.1 Methodology

There is apparently no indisputable method to create a coding system, especially as the aim of such a tool can be quite varied. We therefore started by studying the structure of the reviewed existing coding systems dealing with functional meaning of interactions (Théry, 2018). Indeed, most of the coding systems focus on functional meaning, that is to say the kinds of functional acts which enable communication functions (Schermuly & Scholl, 2012). We listed their coding categories, similarities and differences and then compared those

categories to the kinds of interactions identified in many artificial or real group situations, in recorded or live contexts. Because we intended to offer a system appropriate for all kinds of meetings, we gathered many recorded samples of group situations such as information meetings, decision-making or negotiation meetings (e.g. union meetings), sequences from meetings in films, political debates, and other formal or informal meetings. The running total of interactions included in these samples amounted to around 31,000. This approach also responds to the aim of providing an exhaustive classification of verbal group interactions (Levine & Hogg, 2010). The two authors worked in parallel on the construction of the coding system. By successive iterations and revisions, we excluded existing categories we found hazy or specific to a context, as long as the interaction could be included in another appropriate and precise category. We merged some other categories whose categorisation seemed very close to us. We also added new categories based on interactions we met in some of the group situations we analysed, that could not be coded in existing categories. In the end, each one of the collected understandable interactions could be included in a category. All the remaining categories were then given a clear definition of the types of interactions they covered.

2.2 Structure of the coding system

To reflect the wealth of interaction content, we consider that on top of the functional meaning, two other aspects of interactions should be coded, which will represent the other two dimensions of the IT^{3D}. We hence reject the unidimensional characterization of interactions and consider that every interaction has one unique code on each of these three dimensions. Because of its construction, each dimension is divided into exclusive and exhaustive categories.

This three-dimensional structure helps get a better understanding of the way interactions influence the group dynamics and provide a more exhaustive vision of the intragroup phenomena. The three dimensions are defined below, whereas their categories are detailed later in the article.

First dimension: the functional meaning of the interaction

The *Functional meaning* should report on three kinds of interactions in group situations: content-oriented (i.e. interactions related to the content of the group meeting, aim, task, problem, etc.), process-oriented (regulation i.e. interactions about how to tackle and organise processes within the group) or socio-emotional interactions (i.e. relational interactions involving personal feelings, forming, strengthening or weakening relationships among members) (Beck, 2001; Emmitt & Gorse, 2009; Fisch, 1994). As the IT^{3D} intends to code all interactions, it will include categories dealing with these three kinds of situation, and not be restricted to the ones related to the task, contrary to many existing coding systems. We suggest that the functional meaning of any of these interactions fundamentally belongs to one and only one of those four exclusive classes: *Offering*, *Asking*, *Deciding* and *Socializing*.

Offering and Asking

The first two classes, *Offering* and *Asking,* are about giving or asking for statements or judgements and are the core of any exchange of ideas (Schermuly & Scholl, 2012).

Information, *opinion*, *suggestion* and *metacommunication* are the locus of these offers or questions and can be related to the task, the process or metacommunication in the group.

Information refers to factual elements that are brought into the group. An *opinion* implies a kind of judgement or evaluation and a personal implication from the speaker. In that respect, an opinion generally leads to a higher level of constraint for the addressee(s): rejecting an opinion is tougher than rejecting information. Making/asking for *suggestions* consists of bringing/asking for new ideas and making/expecting proposals that imply a reaction from the group members (in particular, agreement, refusal or suggestion). In the same way that rejecting an opinion is tougher than rejecting information, rejecting a suggestion is tougher than rejecting an opinion. *Metacommunication* is a specific way of communicating in which the object of the communication is the communication process, the interactions or relationships in the group. This will also include clarifications a person can bring to what he has said or done, even if it is usually not enclosed in the common sense of metacommunication (Bateson, 1951, 1972).

Deciding

The third class, *Deciding,* deals with interactions committing the group or its members and concluding debates. It involves both task-oriented and process-oriented interactions.

Socializing

Socializing refers to phatic communication i.e. interactions in the margins of the meeting and contributing to the socialization process. This fourth class takes into account other relationship-oriented interactions "directed at being social" and allowing members to "maintain contact" (Jakobson, 1960; Kulkarni, 2013).

Second dimension: the convergence of ideas

The *convergence* dimension aims at keeping track of convergence or divergence among ideas and embrace the dynamics of interactions instead of looking at them independently. It enables us to take into consideration the direction of an interaction compared with the previous one or clearly-related one i.e. does the interaction support or dispute the previous interaction (or clearly-related one)? Does the speaker support the other's idea or oppose it? An interaction will not be necessarily coded positively or negatively according to this dimension as talk may be neutral compared to the previous or clearly-related interaction, or not absolutely obvious (the position of the speaker is not marked). It then amounts to considering that the interaction is neutral on the convergence dimension.

Third dimension: the interpersonal emotional meaning of the interaction

The third dimension shows the potential relational aspects embedded in the interaction, that is to say an evident positive or negative feeling towards a member or the group as perceived by the coder. It is called the *interpersonal emotional meaning*. Does the speaker give affective support to the other e.g. shows enthusiasm, benevolence or warmth towards a member or defends a member who is attacked? Conversely, does a speaker show signs of irritation, impatience, scorn or aggressiveness in his attitude? Let's keep in mind that we will not necessarily code positively or negatively an interaction according to this third dimension. If an interaction is not clearly affectively-oriented, it will be coded as neutral on

the interpersonal emotional meaning dimension. In the majority of group situations, most of interactions are coded neutrally on this dimension.

Contrary to what was done in previous coding systems such as the IPA, we decided to dissociate the interpersonal emotional meaning of an interaction from its functional meaning. Indeed, these two dimensions seem really independent: for example, giving an opinion (*functional meaning*) can be done with condescendence, warmth or in a neutral manner (*interpersonal emotional meaning*).

This interpersonal emotional meaning dimension is not overlapping the convergence dimension either. For instance, a member of a group can take a stand which is contrary to what was offered previously (*convergence* dimension) while expressing benevolence, aggressiveness or neutrality toward an idea, another member or even the group (*interpersonal emotional meaning* dimension).

An interaction will then be coded on the three separate dimensions of the IT^{3D} coding system, but it can only be coded in one category on each dimension. The categories of the IT^{3D} are presented in Table 1. Let's note that the groups of categories are introduced to make the coding system more didactic and user-friendly and the coding process easier, but do not result from a factor analysis on the categories. Definitions and detailed explanations on the categories are given in appendix 1.

First dimension: functional meaning of the interaction			
Groups of categories		Categories	Category ID
Offering	Gives information	Gives information on the content	OIc
		Gives information on the process	OIp
	Gives opinion	Gives an opinion on the content	OOc
		Gives an opinion on the process	OOp
	Makes suggestion (proposal)	Makes a suggestion (proposal) on the content	OSc
		Makes a suggestion (proposal) on the process	OSp
	Metacommunicates	Gives a feeling, clarification or perception on the group, member or the interaction	OM
Asking	Asks for information	Asks for information on the content	AIc
		Asks for information on the process	AIp
	Asks for opinion	Asks for an opinion on the content	AOc
		Asks for an opinion on the process	AOp
	Asks for suggestion (proposal)	Asks for a suggestion (proposal) on the content	ASc

		Asks for a suggestion (proposal) on the process	ASp
	Asks for metacommunication	Asks for a feeling, clarification or perception on the group, members or the interaction	AM
Deciding		Decides on the content	Dc
		Decides on the process	Dp
		Synthesizes elements before a decision-making stage	DSyn
		Opposes to a decision on the content	DOc
		Opposes to a decision on the process	DOp
		Gives his/her agreement on the content	DOAc
		Gives his/her agreement on the process	DOAp
		Asks for agreement on the content	DAAc
		Asks for agreement on the process	DAAp
		Undertakes doing a future act	DUnd
Socializing (phatic function)		Fosters the conversation, fills the silence, digresses	SConv
		Exchanges polite small-talk, apologizes	SPol
		Makes jokes	SJok
Second dimension: convergence or divergence between ideas			
Interaction going in the same direction as the previous one (or the related one)			Cv+
Interaction going in the opposite direction as compared with the previous one (or the related one)			Cv-
Interaction with no related direction vis-à-vis the previous one or any previous one			Cv0
Third dimension: interpersonal emotional meaning of the interaction			
Interaction including a positive feeling toward a member or the group (encourages, supports, defends)			IEM+
Interaction including a negative feeling toward a member or the group (discourages, shows signs of irritation, impatience, scorn or aggressiveness, cuts someone off)			IEM-
Interaction with no clear positive or negative feeling toward a member or the group			IEM0

Table 1: INSIDE TEAMS^{3D} (IT^{3D}) Interaction coding system

3 Instructions for use of the IT^{3D}

3.1 Coding unit

For any coding system, decomposing discussions into interactions implies defining a clear coding unit which will be the elementary entity carrying a message. Some rules are required to determine how to separate an interaction into coding units. Previous coding systems provide divergent perspectives and recommendations on the definition of a coding unit (Thomas, Bull, & Roger, 1982). For our part, our definition is based on the work carried out for the creation of the coding systems CCS and DCS with some revisions (Beck, 2001; Schermuly, Schröder, Hachtwei, & Scholl, 2010). Therefore, a coding unit is a segment or a complete verbal interaction:

- From a specific member of the group (the coding unit and even the interaction end as long as the member stops talking and another member takes over from him or the meeting is over),
- Directed at the group or a specific member (a new coding unit starts when the speaker clearly addresses someone else or moves from the group to a member or vice versa),
- Belonging to the same category of the coding system (a new coding unit starts as the functional meaning, convergence or interpersonal emotional meaning related to the interaction changes or appears e.g. an interaction was neutral on the convergence dimension and becomes positive on the same dimension).

In this way, one interaction carries out a single thought or idea, thus refining the understanding of speech (Thomas et al., 1982). Contrary to what was embedded in the coding systems IPA or DCS, we do not take into consideration the duration of interactions to divide them into coding units. We consider that differences related to the duration may stem from the fact people do not talk at the same speed and are not as concise as each other, which does not justify a new coding unit.

3.2 Position of the coder

We follow Bales' instructions about the way an observer should position himself to code interactions: the observer tries to think of himself as a generalized group member or, insofar as he can, as the specific receiver of an interaction (Bales, 1950). At no time do we consider the interaction according to the effect on the group or on the task success.

Furthermore, we decide that the rare interactions which are too obscure for the observer should be set aside in order to prevent misinterpretations. Two main kinds of uncertainty are emphasized. Firstly, some interactions are vague and the coder is not able to classify them because this would involve guessing what the speaker meant. For instance, short sentences such as "Oh my God" or "Look where that's got us" cannot be classified if there is a lack of non-verbal support (tone, etc.). Secondly, other interactions seem to be understood by the group or a part of it (i.e. private jokes) but remain abstruse for the coder as the meaning escapes him. Both these cases did not make it possible to conclude on the category to choose without involving much room for interpretation, a position that we reject.

4 Examination of the IT3D compliance with requirements

To demonstrate the validation of the IT3D, we will examine its compliance with our initial requirements of exhaustiveness, user-friendliness (precision and use under real-time conditions) and its logical consistency (Poole & Hewes, 2016).

4.1 Exhaustiveness of categories

One of the requirements when creating the IT3D was to ensure that all interactions could be coded on each of the three constitutive dimensions of the coding system. The early stage of exhaustiveness validation is based on the study of approximately 31,000 interactions extracted from varied group contexts. With regard to the functional meaning dimension, any comprehensive interaction could be coded in one category of this dimension. 1,240 of these 31,000 interactions were excluded as their functional meaning was incomprehensible for an external coder (e.g. interactions which do not make any sense without some context, member talking to himself, private jokes) or as the interactions were cut off.

For the convergence and interpersonal emotional meaning dimensions, the exhaustiveness is obvious because of the symmetrical construction of these dimensions and their inclusion of a neutral position.

4.2 Ability to achieve a high proficiency level under real-time conditions

Many previous coding systems do not provide concrete explanations on the content of their categories and prevent easy training and reliable use of the systems (Théry, 2018). To avoid such difficulties, we developed a detailed coding manual for the IT3D which gives definitions and examples of interactions intended in each category (see appendix 1 for the coding manual). Borderline cases are also provided to ensure coding in line of the IT3D development and a quicker assimilation of the coding system by trainees. After doing two tests, each with 16 individuals, training time is estimated to 1.5 hour to get a high proficiency level with the coding system and 3.5 hours to be able to code correctly under real-time conditions. Reliability results are presented later in the article.

We note after several experiments with trained coders that it is highly possible to follow four to five team members in a meeting under live conditions and code all their interactions on the three dimensions of the IT3D, provided that the discussion flow is normal and the interactions are clearly understandable. We consider that a coder can analyse more members directly if less information is gathered (e.g. taking into consideration a single dimension of the system or group of categories instead of precise categories).

4.3 Logical consistency

The coding system includes three separate dimensions which represent three different aspects of interactions. When studying 31,000 various interactions, all the categories in the system were used: it implies that no useless or marginal category remained in the IT3D. On the functional meaning dimension, we divided the categories depending on their class

(*Offering*, *Asking*, *Deciding* and *Socializing*) and relation to task (content or process) or relationship to facilitate the coding work.

5 Reliability of the IT^{3D}

To ensure the coding system would provide similar results with different raters, we carried out interrater reliability tests. An initial test on two trained coders watching fifty group interactions showed promising reliability rates on the functional meaning (Krippendorff's alpha = 0.898), convergence dimension (Krippendorff's alpha = 0.814) and interpersonal emotional meaning (Krippendorff's alpha = 0.66). Furthermore, we carried out a second inter-rater reliability test on sixteen individuals coding all the sixty-two interactions of the same recorded meeting (including elements from all categories on the functional meaning, convergence and interpersonal emotional meaning dimensions). These individuals were students assessed on their results to get serious involvement of their own. After only a ninety-minute training session on the IT^{3D}, we reached very satisfying reliability rates with Krippendorff's alphas equal to 0.753 for the functional meaning dimension, 0.896 for the convergence dimension and 0.701 for the interpersonal emotional meaning dimension (Hayes & Krippendorff, 2007). A longer training session did not influence the reliability results, but enabled a better fluidity in the use of the IT^{3D} under live conditions.

6 Limitations

One first limitation is related to the wide focus on verbal interactions to the detriment of nonverbal interactions. Even if it was a deliberate choice to restrict the coding of interactions to the verbal ones (especially to keep subjectivity in coding at the bare minimum), interactions which do not contain words were moved aside, regardless the importance and the impact they may have on group dynamics. Another limitation of the IT^{3D} is the difficulty in coding on the interpersonal emotional meaning dimension. As an external coder may face some uncertainty regarding the perception of interpersonal emotional meaning (condescendence, anger, support, encouragement, …), he is supposed to code on this dimension provided that the emotion conveyed in the interaction is obvious. Coding of neutral interpersonal emotional meaning may then be more difficult for an external coder than it would be for an internal member of the group, who may have additional clues to understand the position of an interaction on this dimension. Similarly, the perception of instrumental conflict (negative convergence) and relational conflict (negative interpersonal emotional meaning) may depend on the cultural background of the coder. Indeed, perception of intragroup conflict is differing according to the culture or country of the observer (Bisseling & Sobral, 2011; Parayitam, Olson, & Bao, 2010).

7 Conclusion and future research

In spite of the development of many interaction coding systems, some significant drawbacks still prevent a large use for the study of group dynamics. This article offers and presents a new coding system meeting high expectations for group interactions. The IT^{3D} is

designed to avoid interpretations from the coder, especially on the effect or intentionality of interactions. It also provides a larger overview on the group dynamics and takes into consideration distinct behavioural aspects which are the functional meaning of interactions, the convergence among these interactions and the interpersonal emotional meaning that interactions may include. As it is multidimensional, it is not necessary anymore to choose one among overlapping categories. This coding system is intended to allow coding under live conditions and in many group situations. Knowing that its reliability and validity were also ensured, it brings the opportunity to carry out further research. An interesting angle is to study the functional meaning of interactions to see the emergence of roles, defined as systematic combinations of functional meaning categories. Finally, it may be useful to highlight links among categories of interactions or roles and outputs such as satisfaction, conflict or efficiency, to provide some suggestions for improvement. More generally, approaching team meetings with this coding system can help teams, whether at the collective level or at the individual one, be aware of their interactional styles (for instance, through consulting or coaching sessions).

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Appendix 1: Explanations on the categories of the interaction coding system IT^{3D} (coding manual)

FUNCTIONAL MEANING

OFFERING

Gives information

Category 1: Gives information on the content (OIc)

This category includes statements about the elements which are on the agenda of the meeting or related to the content of the task or the problem to solve. It may be adding a point or mentioning a factual element. *Examples: "The turnover increased by 5%", "This is forbidden by law", "I have talked with the director about this issue", "I remind you that he said earlier he didn't agree with this idea".*

It may contain statements aimed at confirming, rephrasing what is said or clarifying information or a fact which appears obscure in order to give more information or a better understanding of the content. *Examples: "When I said few members answered the survey, I meant about 15", "This is not explicit in the document, but the results take into account all the employees of the firm".*

Interactions whose goal is to rectify someone's words or give one's expertise or experience about the content of the meeting must also be coded in this category. *Examples: "No, it is not planned for next week, but for the week after", "The calculations prove that the driver would not have been able to stop if he had reached such a high speed", "I've already encountered such a problem in the software and it is not possible to fix it without calling the support team".*

Category 2: Gives information on the process (OIp)

This category includes statements about the way the meeting and related processes are organized, the working method that is implemented. It also includes statements presenting the agenda, aims, stakes and deadlines. In this category, we code interactions giving factual elements about what is planned related to the global organization of the meeting (e.g. way of working all together, turns of speech). *Examples: "At the end of the meeting, we expected to decide if this project is worth going on or needs stopping", "If we need more information, Jim is at our disposal to answer our questions".*

It may contain statements aimed at confirming, rephrasing what is said or clarifying information or a fact which appears obscure in order to give more information or a better understanding of the process. *Examples: "I remind you that you have the right to make changes in this document if you want to", "For those who are lost in the document, the tables are given on page 42".*

Any information intended to remind members of the process so that they observe it will be coded in the category "decides on the process" (category 16). *Example: "Remember we decided to finish at 10 a.m.".*

Gives opinion

Category 3: Gives an opinion on the content (OOc)

This category includes judgements and opinions a member is putting forward about the content (i.e. elements which are on the agenda of the meeting or related to the content of the task or the problem to solve). It may contain confirmation or refutation of what is said. *Examples: "I think we should dedicate more resources to this project", "I am not sure this solution is worth being applied immediately", "I completely agree with you on that point", "You can't believe a word of this report, it doesn't prove anything".*

It may contain statements aimed at confirming, rephrasing what someone said previously or clarifying an opinion which appears obscure in order to give a better understanding of the content. *Examples: "What I mean is that I doubt this measure will allow us to reach our goals", "I said I agreed with this idea, but I think that some adjustments will be necessary nevertheless".*

This category excludes interactions which would be disapprovals, refusals, approvals or consents of a group decision. This kind of interactions closer to a decision will be linked to the categories "opposes to a decision on the content" (category 18) and "gives his/her approval on the content" (category 20). Moreover, if somebody paraphrases the opinion that someone external to the group once gave about the content, it will be coded in the first category "gives information on the content" and treated as bringing information to the group about the content. *Example: "The director thinks it will not be successful".*

Category 4: Gives an opinion on the process (OOp)

This category includes judgements, opinions a member is putting forward about the process (global organization of the meeting, agenda, aims, stakes, deadlines, and so on). *Examples: "I doubt we had enough information before the meeting to be able to decide today", "I don't mind whether we start with this point or another", "I think we should enable every member to have the same amount of time to speak in order to ensure greater equity".*

It may contain statements aimed at confirming, rephrasing what is said or clarifying an opinion which appears obscure in order to give a better understanding of the process. *Examples: "It's a good idea to speak in a predefined order as it makes it easier for everyone", "What I wanted to say is that I don't think we will manage to discuss all the points of the agenda today".*

If somebody paraphrases the opinion that someone external to the group once gave about the process, it will be coded in the category "gives information on the process" (second category) and treated as providing information. *Example: "John advised us to discuss this issue first".* Statements which are disapprovals, refusals, approvals or consents of the process submitted to an explicit decision-making stage will be coded in "opposes to a decision on the process" (category 19) or "gives his/her approval on the process" (category 21) as they deeply impact the decision-making outcome. *Example: "I do not agree to take part in this vote".*

Makes suggestion (proposal)

Category 5: Makes a suggestion (proposal) on the content (OSc)

This category includes interactions bringing ideas about the content and that are submitted to the assent of the group or a part of it. Suggesting an idea (imagining new lines of thought, constructing some hypotheses on the content, for instance) implies a reaction expected from the group, in particular agreement, refusal or amendment. It can enable the group to broaden its outlook, think about different elements before drawing conclusions. *Examples: "Maybe the department should implement new procedures in order to make sure the initial requirements can be respected", "Why don't we meet this company to get more details on this product?", "For this vacant position, I'd propose we only select candidates with more than 5 years' experience in the field".*

As a suggestion calls for a reaction from the rest of the group, it is more than just giving an opinion (category 3). Furthermore, the speaker does not impose his idea, so that it is separated from deciding (category 15).

Category 6: Makes a suggestion (proposal) on the process (OSp)

This category includes interactions bringing ideas about the process and that are submitted to the assent of the group or a part of it. Suggesting an idea (imagining new lines of thought, proposing new ways of working, for instance) implies a reaction expected from the group, in particular agreement, refusal or amendment. It can enable the group to consider different possibilities of organizing the meeting or the turns of speech, for instance. *Examples: "We can wait another five minutes to ensure that the late members would join us", "Let's take the facts one at a time", "I think we ought to have an open ballot instead to see who stands where", "Maybe we should have a break for lunch and go on after that".*

As a suggestion calls for a reaction from the rest of the group, it is more than just giving an opinion (category 4). Furthermore, the speaker does not impose his idea, so that it is separated from deciding (category 16).

Metacommunicates

Category 7: Gives a feeling, clarification or perception on the group, member or the interaction (gives metacommunication) (OM)

In this category, the locus of the statement is related to the situation the speaker is dealing with: feeling or perception about what is lived (here and now) in the interaction or the relation with the others or even himself. *Examples: "It looks like it will be hard to reach unanimity on this subject", "There is always one member who opposes the others and makes them waste their time", "I don't see what you're going to prove", "I have never experienced such an effective meeting until now", "Could you stop criticizing the others' ideas all the time?", "Whatever I say, you will always question it".*

Furthermore, it is essential to raise the fact that only the verbal level of the interaction must be considered to code in this category. The tone the speaker adopts and the feeling conveyed through it are mainly taken into account through the interpersonal emotional meaning dimension as it provides no indication alone on the functional meaning of the interaction. On the one hand, an interaction dealing with metacommunication is not necessarily linked to an interpersonal emotional meaning orientation. And on the other hand, interactions dealing with the content or the process can reflect the feelings of the speaker about a member thanks to the tone adopted, e.g. aggressiveness, scorn, impatience, whereas such

interactions are not related to metacommunication at all. In this case, the interaction must be coded in the adequate category on the functional meaning dimension (e.g. "gives an opinion on the content") and also coded positively or negatively on the interpersonal emotional dimension.

This category also gathers statements about the reason why the speaker is acting in a particular way or saying something. It can deal with advancing hypotheses about the other's intentions or motivations about his words or acts, his/her position, the way a behaviour which appears obscure is supposed to be clarified in order to get more information or a better understanding. *Examples: "It is important for me to develop my point of view so that you can understand it", "It is not a personal reaction, I am just tired of wasting my time", "Maybe he reacts this way because he was offended when we said that his idea was not enforceable", "If we do not stop digressing from our matter, I will leave".*

ASKING

Asks for information

Category 8: Asks for information on the content (AIc)

This category includes questions about the elements which are on the agenda of the meeting or related to the content of the task or problem to solve. It may be requiring additions of a point, a factual element which may have been forgotten or just mentioned superficially during the meeting according to the speaker. *Examples: "How many people will be involved in this restructuring?", "What would be the consequences on our turnover if we make this decision?", "When will this new technology be available?".*

It may contain questions aimed at asking for evidence of words which have been made. Examples: "Can you prove what you are saying?", "What do you stand on to affirm these elements?".

It may include questions aimed at asking for a confirmation or rectification, rephrasing of what is said or clarifying information on a fact which appears obscure in order to get more information or a better understanding of the content. *Examples: "Can you confirm these statistics are up-to-date?", "These figures include all the members, don't they?", "When you say there will be new members in the department, how many persons do you mean?".*

Interactions whose goal is to ask anyone to give one's expertise/experience about the content of the meeting will also be coded in this category. *Examples: "Has anybody already used this program?", "Do you have further information on this subject?", "Can anyone confirm these words?".*

Category 9: Asks for information on the process (AIp)

This category includes questions about the way the meeting and related processes are organized, the method which is implemented so that the meeting can take place and the agenda, aims, stakes and deadlines can be taken into account. So we can code in this category questions about what is planned related to the global organization of the meeting (way of working all together, turns of speech) and what is expected (goal of the meeting, decision to make). *Examples: "Who will chair this meeting?", "How long will the meeting*

last?", "Which points are on the agenda?", "What are we meeting for?", "By what date is the report to be presented?".

It may contain questions aimed at asking for a confirmation, precision, rephrasing of what is said or clarifying information on a fact which appears obscure in order to get more information or a better understanding of the process. *Examples: "Can you confirm this meeting will be ended at 8 p.m.?", "Can you be more precise about the way we will work today?", "Does that mean it is necessary to get a unanimous consent before leaving?".*

Asks for opinion

Category 10: Asks for an opinion on the content (AOc)

This category includes questions about a judgement, an opinion of another member of the group about the content related to the meeting (e.g. facts the group is dealing with, ideas developed by another or oneself). *Examples: "What do you think of the solution which is offered?", "Do you all agree with this position?", "Do you have any critical comment about the proposal that has been made?*".

It may contain questions aimed at asking for a confirmation, rephrasing of what is said or clarifying an opinion which appears obscure in order to get a better understanding of the content. *Examples: "Am I right so far?", "Stop me now if I am forgetting something", "Could you be more specific on the type of design you had in mind?"*

Interactions submitting an idea to the group for approval and asking for consent or an explicit agreement, and not only an opinion about the content, do not belong to this category and will be linked to the category "asks for agreement on the content" (category 22).

If somebody asks for the opinion that someone external to the group once gave about the content, it will be coded in the category "asks for information on the content" (category 8) and treated as information research.

Category 11: Asks for an opinion on the process (AOp)

This category includes questions about a judgement, an opinion of another member or the whole group about the process (global organization of the meeting, agenda, aims, stakes, deadlines, and so on) *Examples: "Does it suit you if we begin with discussing the new points?", "Do you want any further point to be added to the agenda?".*

It may contain questions aimed at asking for a confirmation, rephrasing of what is said or clarifying an opinion which appears obscure in order to get a better understanding of the process. *Examples: "Does this way of working suit you?", "Which point do you want to start with?", "Does the meeting timing is all right for everyone?".*

Interactions submitting an idea to the group for approval and asking for a consent or an explicit agreement resulting in a decision-making process, and not only an opinion about the process, will be linked to the category "asks for agreement on the process" (category 23).

If somebody asks for the opinion that someone external to the group once gave about the process, it will be coded in the category "asks for information on the process" (category 9) and treated as search for information.

Asks for suggestion (proposal)

Category 12: Asks for a suggestion (proposal) on the content (ASc)

This category includes questions inviting members to bring ideas about the content and submit them to the assent of the group or a part of it. Asking for suggestions can enable the group to break deadlocks in the discussion, open up new horizons related to the content and may encourage some members to develop proposals. *Examples: "Does someone have an idea of a possible cause of this issue?", "Any suggestion about what should appear in the report?".*

It is different from just asking for opinions as suggestions of ideas (e.g. imagining new lines of thought, constructing some hypotheses on the content) are expected to give rise to reactions from the group, in particular agreement or refusal. Nevertheless, it is not related to an explicit decision to make: the addressee will not have to decide immediately on the content.

Category 13: Asks for a suggestion (proposal) on the process (ASp)

This category includes questions inviting members to bring ideas about the process and submit them to the assent of the group or a part of it. Asking for suggestions on the process can enable the group to break deadlocks in the discussion, open up new horizons related to the process and may encourage some members to develop proposals. *Examples: "So now that we tied in the vote, what do we do?", "Does anyone have an idea about the way of sharing information today, other than a tour de table?", "Which other points may be added to the agenda of the meeting?".*

It is separated from just asking for opinions as suggestions of ideas (e.g. considering other possibilities for the process, offering a new way of working, another organization of the meeting) are expected to give rise to reactions from the group, in particular agreement or refusal. Nevertheless, it is not related to an explicit decision to make: the addressee(s) will not have to make an immediate decision on the process to adopt.

Asks for metacommunication

Category 14: Asks for feeling, clarification or perception on the group, members or the interaction (asks for metacommunication) (AM)

In this category, the locus of the request is related to the situation the addressee of the question is dealing with: feeling or perception about what is lived (here and now) in the interaction or the relation with the others or even himself. That is why it must be distinguished from asking for an opinion about the content or the process. *Examples: "Can you explain us why this conversation makes you so uncomfortable?", "Did my comments hurt you?", "Don't you think we are on the right track to reach our goals?".*

Moreover, the category gathers questions about the reason why a member is acting in a particular way or saying something. It can deal with the other's intentions or motivations about his words, acts or positions. *Examples: "You wanted to say you agreed with us, didn't you?", "Why did you change your vote?", "Is it because of me that you changed your mind?", "What do you try to show?", "What's the matter with you?".*

DECIDING

Category 15: Decides on the content (Dc)

This category includes interactions that endorse or ratify a position and thereby close a discussion on the content. Most of the time, this kind of interactions is used by the member in charge of the group (leader of the meeting) and commits the group. Decisions on the content can be voting, finding solutions and imposing them, giving instructions or sharing the tasks out among the members or assigning work to someone. *Examples: "I'd like to change my vote to not guilty", "I would ask you to discuss this issue with the technical department and explain us your conclusions during our next meeting".* These interventions go beyond taking a stand on a theme submitted for decision: from the speaker's perspective they are not meant to be questioned or discussed, no dialogue is expected. That is why they are not coded in the category "makes a suggestion (proposal) on the content" (category 5) or in the category "asks for agreement on the content" (category 22). Similarly, interactions coming from a common decision-making stage where a member gives his or her approval/refusal to a decision are not linked to this category and belong to the categories "gives his/her approval on the content" (category 20) and "opposes to a decision on the content" (category 18) respectively.

Category 16: Decides on the process (Dp)

This category includes interactions that endorse or ratify a position and thereby close a discussion on the process. Most of the time, this kind of interactions is used by the member in charge of the group (leader of the meeting) and commits the group. Taking decisions on the process can be as varied as organizing a piece of work, giving instructions, assigning tasks, recapitulating the progress of the process during the meeting or giving a member the right to speak. *Examples: "Let's have a ten-minute break", "I call for a new vote", "Mr Anderson, you will insure that all the members here are given the same amount of time", "We have two points left to discuss during today's meeting", "Some people haven't talked yet. We should let them express themselves before moving to a new point".*

It also encompasses calling somebody or the group to order (e.g. putting pressure on the group, inducing action, reframing the debate and preventing digressions, reminding members of what has been decided and must be respected, especially in case of a transgression against this process). *Examples: "There is too much noise. Shall we continue?", "We should stop wasting our time and work at a faster pace", "You have to decide now what you want to do", "This point is not on the agenda, so it is not the place to be referred to", "Aren't we supposed to have a secret ballot, as agreed earlier in the meeting?", "We decided to talk in order, so you have to speak first".*

In this category, interactions are not meant to give pure information about the process, otherwise they would be coded in the category "gives information on the process" (category 2). These actions go beyond taking a stand on a theme submitted for decision: from the speaker's perspective they are not meant to be questioned or discussed, no dialogue is expected. That is why they are not coded in the category "makes a suggestion (proposal) on the process" (category 6) or in the category "asks for agreement on the process" (category 23). Similarly, interactions coming from a common decision-making stage where a member gives his approval/refusal to a decision are not linked to this category and belong to the categories

"gives his/her approval on the process" (category 21) and "opposes to a decision on the process" (category 19) respectively.

Category 17: Synthesizes elements before a decision-making stage (DSyn)

This category includes interactions synthesizing useful elements (information, opinions or suggestions) mentioned during the meeting so that the group or a part of it can have a global vision before making a decision individually or collectively. *Example: "To sum it up, we have the pros and the cons of implementing this structure, as to say, …".*

Category 18: Opposes to a decision on the content (DOc)

Interactions in this category are the ones which indicate that the speaker clearly opposes a decision related to the content, whether it was decided by an isolated member or the whole group (e.g. tasks allocation, solutions provided, future steps of a project). The speaker here refuses to obey what was decided about the content and his opinions are reflected in his interactions. *Examples: "I won't have enough time to make this report, so I won't", "I can't support such an idea and prefer withdrawing from this task", "Whether you want it or not, I don't agree to work in the development team".* It is different from just expressing an opinion against a decision on the content and complying with it nevertheless, as in the category "gives an opinion on the content" (category 3).

Category 19: Opposes to a decision on the process (DOp)

Interactions in this category are the ones which indicate that the speaker clearly opposes a decision related to the process, whether it was decided by an isolated member or the whole group (e.g. refusing to respect the organization of the meeting, the agenda, the required deadlines, the turns of speech). The speaker here refuses to obey the process and his opinions are reflected in his interactions. *Examples: "Despite what you asked, I refuse to vote on this subject", "I won't attend the second part of the meeting", "I know the order to speak but I will explain myself now".* It is different from just expressing an opinion against a decision on the process and complying with it nevertheless, as in the category "gives an opinion on the process" (category 4).

Category 20: Gives his/her agreement on the content (DOAc)

This category includes interactions giving an agreement on a decision on the content: the speaker shows he agrees with a decision or a suggestion which was made (formally or not) on the content. *Example: "It's fine with me, I agree with these deadlines".* It differs from just giving an opinion on the content (category 3) going in the same direction as the previous interaction: approving implies committing oneself i.e. the speaker undertakes to follow and does not protest or oppose what is planned due to the decision.

Category 21: Gives his/her agreement on the process (DOAp)

This category includes interactions giving an agreement on a decision on the process: the speaker shows he agrees with a decision or a suggestion which was made (formally or not) on the process. *Example: "As I am the only one in this position, I will bow to the procedure you chose".* It differs from just giving an opinion on the process (category 4) going in the same direction as the previous interaction: approving implies committing oneself i.e.

the speaker undertakes to follow and does not protest or oppose what is planned due to the decision.

Category 22: Asks for agreement on the content (DAAc)

This category includes interactions asking for an agreement on a decision or suggestion on the content: the speaker makes sure that the decision to make suits every member. *Examples: "Has anybody something to say against this proposal?", "Does anyone object or is this ok for everybody?".* This is not a matter of asking for an opinion (such interactions will be coded in the category 10) as an approval (or refusal) is expected from the question.

Category 23: Asks for agreement on the process (DAAp)

This category includes interactions asking for an agreement on a decision or suggestion on the process: the speaker makes sure that the decision to make suits every member. *Examples: "Does anyone do not want to vote?", "Does everyone agree on modifying the way of working?".* This is not a matter of asking for an opinion (such interactions will be coded in the category 11) as an approval (or refusal) is expected from the question.

Category 24: Undertakes doing a future act (DUnd)

This category includes interactions through which the speaker commits himself or his collaborators to carry out a future act. Contrary to some decisions made on the group, interactions belonging to this category do not compel the entire group to do anything. It may be an answer to a requirement of another member (asking the member to undertake doing an act) or a spontaneous proposal. Examples: *"I will be in charge of the communication with the direction", "I will write the verbatim records of this meeting and send it to you", "My team will propose further analysis for a week's time".*

SOCIALIZING

Category 25: Fosters the conversation, fills the silence, digresses (SConv)

This category is dealing with interactions which are not related to the content, the process and what brings the members together, but tend to digress. It includes interactions meant to engage another in a talk to prevent a lull (e.g. talk about the weather, the daily life). Such interactions can be affirmations or questions. The addressee of such an interaction answers with an interaction belonging to the same category if he intervened within the same perspective. If he seems to answer succinctly (e.g. out of politeness or lack of interest) without really fostering the conversation, this interaction will be coded in the category "exchanges polite small-talk, apologizes" (category 26). Some other interactions which don't intend to open a discussion with other people but to talk about oneself without metacommunicating are also included in this category.

Category 26: Exchanges polite small-talk, apologizes (SPol)

This category includes signs of politeness such as saying hello while entering the room, thanking people for their talk or presentation, apologizing for keeping people waiting, offering one's apologies for one's behaviour or words, asking for the right to speak. It also encompasses interactions showing explicitly that the speaker is listening and receptive to someone without giving an opinion, whether it is related to the content of the meeting or

not. *Examples: "Yes, I see", "All right"*. All the interactions belonging to this category should contribute to the socialization part and should not be mistaken for bringing or asking for information, opinions or suggestions very politely. In this case, the interactions will be coded in the adequate category according to their functional meaning and also positively on the third dimension of the coding system (interpersonal emotional meaning).

Category 27: Makes jokes (SJok)

This category includes interactions intended to improve the atmosphere by telling a joke on purpose, no matter the effect on the group which may appreciate and understand it or not. Conversely, all interactions making a member smile or laugh should not necessarily be coded in this category, especially if the reaction seems to be related to mocking, sarcasm, cynicism or irony. Such interactions should be ruled out and coded negatively on the third dimension of the coding system (interpersonal emotional meaning).

Additional comments

Note that when a piece of information is integrated in an opinion, for instance to legitimate one's position (i.e. *"all big companies use such a system"*), this interaction will be coded as an opinion.

Coding an interaction in a category (or before that, to a group of categories) on the functional meaning dimension should not be based on the interrogative or affirmative form of this interaction. For example, interrogatives do not necessary belong to categories from the group category "asks": the meaning must be evaluated to realize when it contains explicit rhetorical forms. Conversely, affirmatives may clearly encourage members to answer, i.e. *"I don't know what you mean"*.

Furthermore, it is important to distinguish what belongs to opinion, suggestion or decision. A member giving an opinion only expresses a point of view, without necessarily expecting an open reaction or adhesion from the group. *Example: "It is a shame we do not start now"*. Making a suggestion commits the speaker as the group is intended to analyse the proposal (e.g. *"Why shouldn't we start now?"*), whereas deciding does not involve any discussion and sharing anymore. The speaker is imposing his or her idea. *Example: "Let's start now"*.

CONVERGENCE

Negative convergence

An interaction will be coded negatively on the convergence dimension (Cv-) if it is undoubtedly disputing the immediately previous interaction and any previous interaction which is clearly-related. Any interaction which opposes another interaction will be coded negatively on the convergence dimension, but interactions which add different or new ideas in another direction, but without defeating directly and obviously another interaction, will be considered as neutral regarding the convergence dimension.

Each interaction belonging to the following items on the functional meaning dimension will be coded negatively on the convergence dimension: "Opposes to a decision on the content (DOc)", "Opposes to a decision on the process (DOp)".

Examples: “We shouldn’t choose this solution”, “I am not sure it is a good idea”, “We only have 5 minutes, not 10”.

Positive convergence

An interaction will be coded positively on the convergence dimension (Cv+) if it is undoubtedly supporting the immediately previous interaction and any previous interaction which is clearly-related. Any interaction which supports another interaction will be coded positively on the convergence dimension, but interactions which add different or new ideas in the same direction, but without agreeing directly and obviously with another interaction, will be considered as neutral regarding the convergence dimension.

Each interaction belonging to the following items on the functional meaning dimension will be coded positively on the convergence dimension: “Gives his/her agreement on the content (DOAc)”, “Gives his/her agreement on the process (DOAp)”.

Examples: “Your idea is good”, “I prefer Tom’s proposal”, “I agree to do this part of the task”, “That’s right, John also told me it would be done by September 1st”.

All the interactions which do not belong to the items “Opposes to a decision on the content (DOc)”, “Opposes to a decision on the process (DOp)”, “Gives his/her agreement on the content (DOAc)”, “Gives his/her agreement on the process (DOAp)”, can be coded negatively, positively or neutrally on the convergence dimension.

Neutral convergence

If the interaction is not clearly supporting or opposing another interaction, it will be coded as neutral on the convergence dimension. If its position is not obvious, the coder will consider this interaction as neutral on the convergence dimension.

INTERPERSONAL EMOTIONAL MEANING

Negative interpersonal emotional meaning

An interaction will be coded negatively on the interpersonal emotional meaning dimension (IEM-) if it undoubtedly shows signs of irritation, impatience, scorn or aggressiveness. Similarly, an interaction which clearly cuts another interaction (which lasted for a few seconds) is also coded negatively on the interpersonal emotional meaning dimension. An interaction can be coded as negative on the interpersonal emotional meaning dimension regardless its category on the functional meaning dimension or its position on the convergence dimension. For instance, an interaction can be coded neutrally on the convergence dimension and negatively on the interpersonal emotional meaning dimension. Conversely, an interaction can be coded as negative on the convergence dimension, but neutrally on the interpersonal emotional meaning dimension.

Examples: “I already told you twice we had 10 minutes” (with irritation, impatience), “I am fed up of working with you”, “You always suggest silly ideas”.

Positive interpersonal emotional meaning

An interaction will be coded positively on the interpersonal emotional meaning dimension (IEM+) if it undoubtedly shows signs of support, benevolence or warmth towards a member or his idea, or if it is defending another member who is attacked. An interaction can be coded as positive on the interpersonal emotional meaning dimension regardless its item on the functional meaning dimension or its position on the convergence dimension. For instance, an interaction can be coded neutrally on the convergence dimension and positively on the interpersonal emotional meaning dimension. Conversely, an interaction can be coded as positive on the convergence dimension, but neutrally on the interpersonal emotional meaning dimension.

Examples: "Come on, come on, we will do great" (with encouragement), "I think it is a really nice option, Andy" (with enthousiasm).

Neutral interpersonal emotional meaning

If the interaction is not showing any positive or negative signs of emotion towards another interaction, it will be coded as neutral on the interpersonal emotional meaning dimension. Similarly, if its position is not obvious, the coder will consider this interaction as neutral on the interpersonal emotional meaning dimension.