

The positive side: an inquiry into mind-wandering in teaching-learning situations

Il lato positivo. Una ricerca sul mind-wandering nelle situazioni di insegnamento-apprendimento

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ABSTRACT

The article addresses an overlooked topic in the field of educational sciences: teachers' experience about mind-wandering, and presents a study that analyzes the dynamics of the psychic phenomenon by a combination of a new methodology and Interpretative Phenomenological Analysis (IPA). First, we present the phenomenon of mind-wandering as a relevant object of study, then we suggest that it can play a positive role in teaching-learning activities.

We aim to provide a richer picture of the process that is commonly understood as a shift in attention. Through the discussion based on real-life field study on seven primary and secondary Italian school teachers, we show how mind-wandering is a relevant psychological phenomenon, a space of exploration and reflection where teachers rethink completely their role with regard to the students, and reconsider their mental process engaged in planning their own work. Thanks to the proposed methodology, one can gain a deeper access to teachers' subjectivity, both as individuals absorbed in learning situations but also in their experiences, beliefs, images and social representations of mind-wandering that are connected to a specific cultural context, fieldwork, and activities of meaning construction.

L'articolo affronta un argomento trascurato nel campo delle scienze della formazione, l'esperienza degli insegnanti del mind-wandering. Si propone lo studio delle dinamiche del fenomeno psichico con una nuova metodologia combinata all'Interpretative Phenomenological Analysis. Inizialmente, presentiamo l'oggetto di studio, il mind-wandering, e successivamente, vediamo come possa svolgere un ruolo positivo nelle attività di insegnamento-apprendimento.

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Il nostro obiettivo è fornire un quadro approfondito di questo processo che viene comunemente inteso come uno spostamento dell'attenzione. Attraverso la discussione dello studio condotto nel contesto di vita reale di sette insegnanti italiani della scuola primaria e secondaria, mostriamo come il *mind-wandering* sia un fenomeno psicologico di rilievo, uno spazio di esplorazione e riflessione dove gli insegnanti ripensano il proprio ruolo nei confronti degli studenti, un processo mentale impegnato nella pianificazione del loro lavoro. Grazie alla metodologia proposta si ha un accesso immediato alla soggettività degli insegnanti in quanto individui assorbiti sia dalle situazioni di apprendimento sia dalle loro esperienze, credenze, immagini e rappresentazioni sociali del *mind-wandering* che sono connesse ad uno specifico contesto culturale e lavorativo e all'attività di costruzione di significato.

KEYWORDS

mind-wandering; cultural psychology of education; new methodology, IPA analysis
mind-wandering; psicologia culturale dell'educazione; nuova metodologia, analisi IPA

Introduction

In everyday life, conscious experience is changeable: it rarely remains on one task or on one topic for an extended period without deviations. In some cases, the shift in focus can be described in terms of *mind-wandering*. According to the most common definitions in experimental psychology, *mind-wandering* (MW) is an attention shift from a current task to “task-unrelated thought”, “task-unrelated images and thoughts”, “stimulus-independent thought”, “mind pops”, or “zone outs” (Philips, Mills, D’ Mello & Risko, 2016; Jha, Morrison, Dainer-Best, Parker, Rostrup, Staley, 2015; Smallwood, 2013; Smallwood & Schooler, 2006; Singer, 1966;1974; Antrobus et al. 1966). MW has a number of definitions and dimensions, which seem to encompass a broad range of phenomena, and to predict a number of important functions and outcomes: social cognition, mental imagery, inner speech, guilt, fear of failure, poor attentional control (McMillan, Kaufman, & Singer, 2013; Meta Regis, 2013; Seli, Beaty, Marty-Dugas, & Smilek, 2019; Fossa, Gonzalez, & Di Montezemolo, 2019).

In literature, one can encounter two main perspectives on MW: on the one hand, *mind-wandering* has been associated with beneficial processes such as goal-directed thinking, planning and creativity. On the other hand, it correlates with costly outcomes such as attenuated processing of the environment, driving accidents, learning disruption, affective dysfunction and impaired performance in daily life (Dario & Tateo, 2019).

When it comes to formal education and to teaching-learning practices, many of them are still largely based on the assumption that continuous attention is fundamental in the classroom, and that one of the teacher’s tasks is to control and maintain students’ focused attention, avoiding “distractions”. However, the ubiquitous nature of a psychic phenomenon such as *mind-wandering*, led the authors of this study to wonder if it is not simply a matter of “distraction”, and if this phenomenon plays a more central role in teaching-learning. We think that further theoretical and empirical explorations are thus required, not only to understand the complex phenomenon of MW in relation to the other psychic experiences,

but also to evaluate its positive and negative aspects in everyday experience. This study is part of a more detailed research project studied in different educational teaching-learning situations: lecturing, cooperative learning and testing. In the article we are interested in addressing teachers' experience about mind-wandering, and we present a study that analyzes the dynamics of the psychic phenomenon through a combination of a new observation methodology (Dario & Tateo, 2019) and Interpretative Phenomenological Analysis (IPA). In the first part of the article, we treat the phenomenon of mind-wandering as a relevant object of study in educational sciences, then we suggest that it can play a positive role in teaching-learning activities. Through the discussion based on a real-life field study on seven primary and secondary Italian school teachers, we show how mind-wandering is a relevant psychological phenomenon, a space of exploration and reflection where teachers rethink completely their role with regard to students, and reconsider their mental process engaged in planning their own work.

1. Mind-wandering in learning-teaching settings: new research questions

There is not much attention in educational sciences paid to mind-wandering¹. This lack of interest toward this topic seems unjustified, in particular if one considers the impact of the phenomenon in psychic life: MW occurs in approximately half of thoughts-content when awake (Killingsworth and Gilbert, 2010). In education, where mind-wandering is common (e.g. any teacher has probably observed students while they are partaking in an "absent minded job, as if they have stopped in time": *account of primary school pupils during a focus group*), the studies are limited to literacy skills (reading and comprehension); memory (Martin, Mills, D'Mello, Risko, 2019; Philips et al. 2016); to a single primary task and at university settings (Wammes et al. 2019); to academic performance (Lindquist & McLean, 2011); or to manipulation of a single factor as the "live teacher presence" (Varao-Sousa and Kingstone, 2015). As claimed by Irving and Thompson (2018), the mainstream cognitive research, in its definition of the phenomenon, does not account for the dynamics of MW (i.e. the task, the unrelated thoughts that are not mind-wanderings, and the ways in which MW can be task-related). We suggest that this limited interest and few real-life empirical studies in school context are due to a taken for granted: mind-wandering equals distraction.

In this article, we claim instead that MW is a relevant psychic process. To appreciate its real functioning in educational activities, it must be studied in its micro-genetic development, during the activity in real-life learning and teaching settings. In particular, the direct experimental methods such as probe-caught and self-caught, so far used in ecological studies, tend to stop the ongoing activity, and there are no elements able to re-conduct the subject to the actual MW experience. Hence, we felt the need to elaborate a new methodology for studying this

1 A search on Scopus and WOS Databases, using the terms "mind-wandering", "daydreaming", in the fields "Title, Abstract, Keywords" shows that much of the research on the subject developed after the publication of the seminal work of Smallwood et al. (2006), and it is linked to the control structures of the states of consciousness of the subject (control processes) and cognitive process. This is confirmed by the greatest number of publication emerging among others on "Consciousness and Cognition". The contributions of learning and teaching are connected with the theories of learning where we can find an interest in cognitive studies and few studies on mw connected with theories of education or training. Szpunar, Moulton and Schacter (2013) provide a non-systematic review of the literature in the field, yet still with the idea of *curbing* the occurrence of MW in education.

phenomenon in the environments where learning takes place, and one can observe more than one factor in action: teacher presence, materiality, social setting, multiple perspectives. In this perspective, a number of new potential research questions emerge: what is the role of MW in learning processes? What does it happen during MW in classroom? How does it happen and to whom? Can MW be part of teaching-learning processes, as the other mental functions? How it is experienced by teachers and students? The field of mind-wandering in educational contexts becomes so fruitful and open to explorations.

Among the different questions, that we have just begun to address in a previous work (Dario & Tateo, 2019), this article focuses in particular on the study of teachers' MW during their lessons, and on how it relates to their perspective on students' experience. The purpose is to understand the teachers' experience of MW in classroom. The research questions concern the perception of the MW and the similarities and dissimilarities between teachers' and students' experience.

The empirical study is based on an adaptation of the protocol to study MW (Dario & Tateo, 2019)². The approach described in the following section is based on: data collecting in an ecological setting, first person prospective approach toward teachers' narration, the idea of studying teacher mind-wandering in its development and the co-generation of meanings considering both participants' and researchers' interpretation of this psychic phenomenon (Dario & Tateo, 2019).

2. Methodology

We developed a specific empirical protocol using a mix of methods that would capture both the qualitative and the quantitative attributes of MW situations in the classroom (Dario & Tateo, 2019). For this sake, we chose to observe different types of activities in different school grades. Aware of the heterogeneity of teaching activity, we limited the fields to three learning situations: lecturing, cooperative learning and testing. We asked teachers to describe their lessons in details in order to better define the characteristics of the teacher and teaching methodologies. The focus of this protocol is on teachers' MW narrations that we analysis using Interpretative Phenomenological Analysis (IPA).

2.1 *Participants and Design*

The observations discussed in the next section are part of a larger study on 103 Italian students of Primary, Middle and High School, aged between 8 and 18. For the sake of this article, 7 tenured teachers involved in the study on a voluntary basis are presented. The teachers (2 from primary, 2 from middle and 3 from high school respectively) participated in a kick-off meeting to discuss the protocol and to complete a questionnaire about the learning activities. They were video-recorded with their students and they were interviewed on their MW experience, at the end of their lesson, during a break or in a moment of rest. The students have been selected because they were cited by their teachers during the interview. Thus, we decided to insert them to further develop and enrich the analysis (e.g.

2 The rationale and the phases of the protocol are detailed in Dario & Tateo (2019) and in a form that makes easy to replicate the study.

“X certainly was mind-wandering when because...”; “He always wanders during school lessons”, “he considers himself inept”).

2.2 *Observation protocol*

The protocol used in the present study is adapted from Dario & Tateo (2019)'s structure, applying it to teachers and to one or two students, who were cited during the interviewing phase.

A quite simple observation protocol was constructed, using a mix of observations, interviews and teachers researchers' joint interpretations. The protocol consisted of:

- a brief questionnaire, completed by teachers before each lesson in which they stated the contents and the methodologies used.
- a 15/20-minute video-recorded lesson in which the students and teachers marked mind wandering by inserting a small cotton ball in a plastic cup.
- an in-depth and a semi-structured interview³ conducted with teachers and the selected students. Interviews revolved around MW experience participants had during the recorded lesson and also while they were watching it on the computer.

The protocol is built to include a description of the whole teaching/learning process, and to grasp the perspective of the teachers involved considering students and researchers, too.

2.3 *Data Collection protocol*

We have tried to develop an observation protocol that is sensitive to both the personal meaning-making of teachers and the ecological conditions in which the MW episodes emerge and fade away (Dario & Tateo, 2019). The protocol contains the phases illustrated in figure 1. Here, we give a brief presentation and we highlight changes that we made.

3 The choice of the semi-structured interview form is based on the need of a script to guide the interview; prepare material to facilitate the recording of the dialogue and systematize the interview in a textual form. This process of constructing texts creates a logical structure for each response that in turn facilitates data analysis. In this regard, the current study has been conducted using semi-structured interview but the researchers prepared the questions in accordance with principles such as: clarity, a series of open and focused questions, avoiding instructions and arranging questions logically (Ergenekon, 2007).

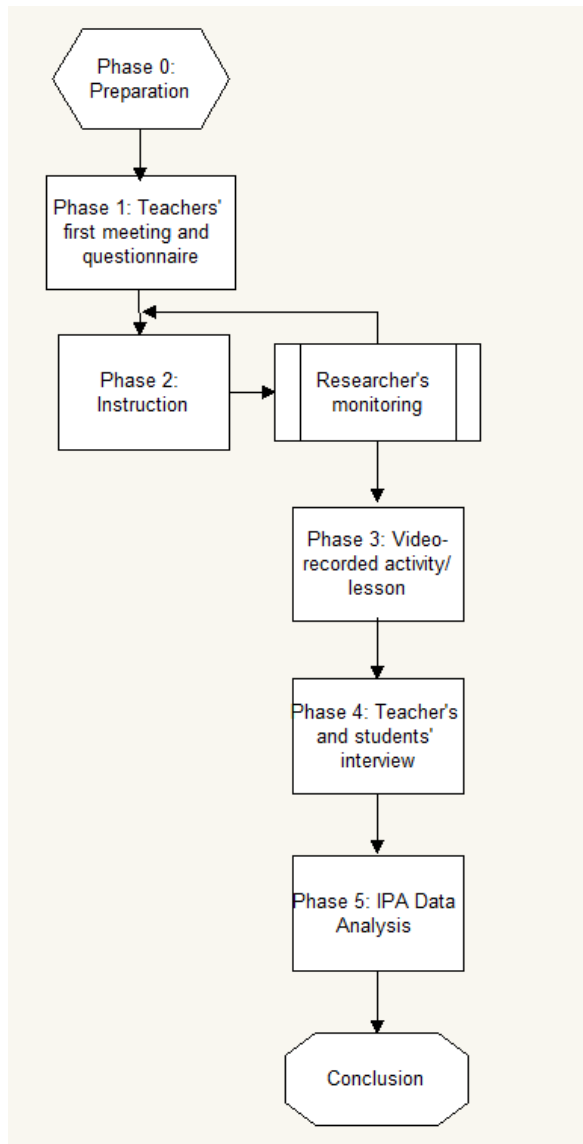


Figure 1. illustrates the different methodological phases

First, we established a collaboration with the school, meeting the principal and the teacher interested in participating to the study. On this occasion, the researcher had the opportunity to clarify and answer all questions. In phase 1, the teacher scheduled times and activities that will be video-recorded, and a brief questionnaire was submitted to describe the planned teaching/learning activities that will be observed.

During the instruction phase (phase 2), the researcher presented the study and the task to both teachers and students: they'll have to signal their MW by putting a cotton ball in the container on their desk every time they realize they

are having a MW experience (only students were given a limited number of ball while teacher received more than 20 balls each).

However, the teacher and students who needed more balls could indicate it/the numbers on the sheet of paper that they received at the end of section/lesson (15/20 minute). The researcher monitored this phase, in order to check whether the teachers understood the task. Participants asked questions and received answers. Then the activity was video-recorded (phase 3). During their free time, teachers were interviewed⁴.

The researcher ensured participant's responses anonymity. Each teacher's interview (video-recorded) was divided in two parts. First, we asked students about their experience and what they remembered about MW episodes. Then, they could watch some of the video-recorded moments of the activity in which they put marbles in the container and were asked about those moments, the transitions in and out MW episodes, the contents of the episodes and the modalities (visual, imageless, auditory, etc.). The conversation was terminated when we found an answer for each main theme, with a step by step interview.

Afterwards, the researcher watched the video and then conducted the participants to a different room, where she gave them an introductory speech and informed them that their opinions would be used for scientific purposes. These interviews lasted 30/40 minutes each.

The video-recording of the classroom activity is used as a boundary object, a mediation tool through which student and researcher construct a shared understanding of the student first-person account. It is not a "real time" access to MW, but it is surely a step forward the observation of the phenomenon in its context.

2.4 IPA Approach to Data Analysis Phase

The interviews with teachers are analyzed with IPA theoretical orientation (Smith & Shinebourne, 2012), in which persons make sense of their experiences and are considered "self-interpreting being", actively engaged in interpreting the processes, events and people in their lives (Appendix 1). In the first place, IPA approach is a dynamic process in which both the researcher and the participant have an interpretative role, and they evaluate the private nature of mind-wandering. The step-forward with respect to the previous studies is to examine the individual perspective before inductively formulating a hypothesis. Each teacher is considered as a single case, a specimen of generalizable theoretical dimensions of MW (Valsiner, 2017). The primary concern of IPA approach is to elicit rich, detailed and first-person accounts of experience and phenomena under investigation and it is connected with semi-structured, in-depth, one-on-one interview where researcher and participants are engaged in a dialogue in real time.

According to this approach, researchers totally immersed themselves in the data and give evidence of the participants' making sense of phenomena under

4 The researcher gave the teachers and students an informative message and remained in the classroom to answer questions: "All you have to do during this lesson, is signal by inserting a marble into a plastic cup when you notice that your mind is beginning to wander, you are not completely focused on the task at hand and / or you are thinking about something else. Don't worry, there is nothing strange or unusual about all this; in fact, it happens about 4000 times a day. The purpose of the research you are participating in is to understand its usefulness in education. I remind you that the entire procedure is video-recorded and will be commented upon with those of you that will be interviewed"

analysis. In Appendix 1 is presented an example of an interview to one of the teachers, where we conducted:

- a multiple reading of the transcript,
- a transformation of notes into emergent themes,
- a research of relationships.

3. Results

All teachers have been interviewed after each of the three learning activities: lecturing, cooperative learning, testing, so the material was very rich and the full discussion would exceed the space of a single article. We will here discuss the themes that are in the foreground in teachers' reflections. Teachers reported a personal interpretation of the MW phenomenon and of the implications for learning-teaching situations. All interviews presented a similar pattern, but differences emerged in teachers' interpretation of the phenomenon.

We reported the analysis divided in three parts: teachers' experience of mind-wandering, similarities and dissimilarities between teachers and students and teachers' reflexivity. As explained above, the majority of the participants expressed an opinion or described how the students appeared during the protocol.

3.1 Teachers' experience of mind-wandering

The teachers always started by presenting the class perception: "All students seemed calm", "at the beginning, they were aware of the presence of the camera but then...", "This activity generated in my students this..." It is worth noting the reference to a normality in classroom atmosphere that the teacher uses as a point of reference in evaluating the events

T1⁵: Before starting, I thought it would be worse: of being under...(observation), you know, under...so judged as teachers by you ...but then I noticed the students...they haven't done anything differently from the daily routine. At the beginning, the first time I saw that they were a bit (*nervous*)...but then they were calmed down.

T1: No, no, also today those who normally pay attention, did so... those who are usually distracted, didn't behave differently.... And then there are those who didn't insert (cotton) balls but there were many who were distracted.

T5: [...] but the children because it is a novelty for a brief period are aware of its presence but after a while they don't even notice it anymore. During the activity, maybe it was Robert who was distracted, during the activity... and he told me that the computer was dying out...you see, during the lesson, I was thinking precisely of him (student) him that I don't understand...

I: What does it mean?

5 Teachers' and students' opinions were cited by coding them without using their names in accordance with privacy policy. In this regard, individuals were respectively coded and numbered T and P and a progressive number. All names reported are fictional.

T5: that he often seems lost, wandering, that he stares into something but then he comes out with a pertinent answer... pertinent... he has always had this halo of mystery, let's say... he seems a distracted child but actually he follows and he is also sharp in his contributions. Consider that in his first class I asked for (psychological) counselling for him because he didn't talk and so I asked for counselling...It turned out that he is anorthographic⁶ but has no difficulties to understanding... but he never paid attention?!

The folk normative theories (Olson & Bruner, 1996) about student development, learning, attention, education and behavior constitute the interpretive framework for the personal conducts of students, leading to an overrepresentation of learning problems or disruptive behaviors. The teachers' interpretive framework – that values control, attention, focus on task, and on teacher's speech in classroom - contributes to the negative evaluation of MW experiences as distractions.

The teachers thus associate mind wandering with distraction and low students' performance trying to find examples that illustrate this, as reported by T1 and T5.

3.2 *Similarities and dissimilarities between teachers and students*

Teachers distance themselves from mind-wandering, by affirming that this could never happen to a teacher because she has no time for it. Yet, they are embarrassed of their own MW when it occurs.

I: Does it happen at school?

T1: No, because I have one lesson after another.

T2: Let's say it quite difficult in my opinion, for a teacher to get lost in his own world if he is standing. If you lose control it's the end of it but if move around among them...If you teach directly from a book, it is easier to lose control ...I have to control them because otherwise their minds start wandering out of boredom, especially when they have the sensation that they are not being monitored.

I: What emotion do you feel? Is there an emotion?

T3: Yes, there is a bit of disappointment because I realize that different thoughts (MW) interfere with what I want to do at that moment and there is an unproductive interference because I go back to these thoughts and they interfere with the production and since I am in class...I keep an eye on what I'm reading and one on the class because it is not being at home... It is source of distraction. I end up I combine little because when I tell myself: "Now, they are doing the test on their own, because they are old enough I'll correct the other class's test but...this only happens a third of the time because... between keeping an eye on the class, correcting the test and day-dreaming.... This bothers me a little.

I: As a teacher, have you ever thought of something different from what you are actually doing?

T5: Yep, yep... I realize that I get distracted but I would know why. This happens when I lose track of what I'm reading and I have to go back but I can

6 As synonymous of *agraphia*, it indicates a loss of the ability to write or to express thoughts in writing generally because of a brain lesion.

also have casual thought...or thoughts about things that really worry me.
[...]

I: Can't you remember the content?

T5: No, I can't recall the content but it (MW) happened for sure ... after all that happened (she is referring to the outbreak that hit the school) at school, I usually think: "if all this has happened to me...imagine the children!".

T2 emphasized the point that lab work in which students were involved in groups hasn't run into any glitch and doesn't allow any mind-wandering because it is too hectic for him. He underlines how this type of work required the teacher to be always present, to be in *here and now*. He is distressed when he realizes that some of his students (half of them were not doing anything during his class), and he blames himself for having given them the opportunity to get distracted. The normative frame leads the teacher (T5) to interpret any shift of focus as a problematic situation, even her own MW.

I: Have you thought anything else during this lesson?

T2: Not really. Let's say that this type of lab it is very demanding and they have to work with pictures, with the chronometer, and they have to time the dying/coloration process. Maybe, when we were at a third through the lesson I thought I could have prepared twice as many kits in order to involved the other half of the class but...the problem is that if you don't have a technician that help you, you can only follow half of the class... till they become independent but in a month or two, they will be able to work simultaneously... This is normal because they are not self-sufficient enough.
[...]

T2: I thought I could have prepared one kit for group so that they could have work simultaneously as you can see here...they surely have thought about something else.

I: Did you get this idea because something happened?

T2: No, it came back...I had the same thought before...since in this case we use acids, solutions so that I can leave them alone... They have to be followed...You can see (in the video) that they asked for help. we shall see... They think about something else however if they had been in (groups) of three peoples I sure I could have motivated them...You see (in the video) one can prepare a report, one can wear the lab coat and another one can help in the preparation but the third person it is almost superfluous ..he doesn't know where to place himself. If they have a rule, it is unlikely that they get distracted.

I: Is there something in this situation that triggered the thought?

T2: No...You see when a person is in the lab he uses a highly concentrated acid...and I also have to make sure that they walk around with pipette...I have no time to think about something else...been in charge of four groups of four people each it is difficult enough.

you can also see from the video that they are calling me at the same time and I am a bit distressed by the fact that they get stuck and I think about it...

I: So you have a number of thoughts one after the other?

T2: Yes...that's way in my lab I need an experienced technician.

For example, I noticed that some students were at the far end of the classroom and they were not participating and call one of them trying to getting involved.

T2 describes an interesting movement between the *here and now* and the immediate future. She acknowledges it as problematic, but we may suggest a different interpretation. T2 is involved in a continuous as-if/as-is elaboration ("I could

have”; “they have to”; “it came back”; etc.) that links the previous choices to the monitoring of the ongoing activity and the exploration of alternatives.

In the previous example, also T3 and T5 describe disengagement from the task as problematic distraction, like in the case of students. The teacher engages in too many off-task thoughts while reading, which reduces her comprehension. As Franklin, Smallwood and Schooler (2011) McVay and Kane (2012) and Smallwood, McSpadden and Schooler (2008) confirm, success in school depends on reading comprehension, thereby reducing the amount of time spent in off-task thought would be one way of improving academic performance. This is one of the main aspect stressed by research that has concentrated its interest on these aspects: reading/lecturing comprehension. However, T5 explains this phenomenon in other terms: “While analyzing the test (testing), they are more concentrated on what they are doing but reading it is more of an automatic action for them. If I read aloud, I don’t always know what I’m reading it is as I separated the two things”. Furthermore, T5 describes the perception of blank thoughts connected to this “automatic reading” and the painful experiences of mind-wandering without contents. She is embarrassed for not remembering part of the activity, too.

The influence of “re-reading” experience in students and teachers is explained by Philips *et al.* (2016): when you read over and over again the same text, deliberate mind-wandering increases due to lower demands in executive control. In a sense, if teacher T5 has to test reading skills in her pupils, this protracted activity will leave children free to wander. All teachers connected MW with personal experience of boredom and repetitive actions. Teachers indicated Teachers’ Refresh Courses as a common situation when they wander (T1: [...] But, if I can safely say... when we attend a training course...Some courses are so boring...I wander...So, everyone wanders with his mind). T1 finds that similar activities in our daily life are: attending to mass and ironing.

I: Have you ever happened to have any?

T1: Yes many...during Mass... but during the sermon, I mean... the first five minutes, maybe yes (referring to her attention span),... then if it is interesting maybe even ten minutes otherwise....I have many (referring to MW).

I: Is there a recurring mind-wandering?

T1: Ah...when i put in in my head to do a chore at home, I keep hearing a voice that every second says to me: “Lucia, you must do that chore ...but I swear... A times I invent chores like for two consecutive times, I have renovated the house window, I mean, it a men’s job. In such a hard job, but if I put it into my head to do something... I may be talking to you but I’m really thinking about that job. It is like when you wake up in the morning and a tune pops into your head and it stays there the whole day long.

I: When you have a mind-wandering episode? Do you know where you are? Do you know what’s happing around you?

T1: In my case, for instance, it happens while ironing and the I start thinking and then I really find myself somewhere else. I’m in the basement ironing... It’s just me and Lilly (her dog) but if the bell rings, I don’t ever hear it.

Perhaps, when I was listening to the sermons, I didn’t notice if the lady next to me, turned or you look but you only see the emptiness...You look into the emptiness...

In the examples above, one can appreciate the role of the context in the meaning-making of MW experience. Depending on the context of activity (class, mass, chores) the experience takes a different value and different justifications are elab-

orated. Besides, the excerpts show the relationship between inner generated thought in MW and environmental conditions. There seems to be no mutual exclusion (MW as escape from reality), rather a mutual feeding of one process into the other.

3.3 Teachers' reflexivity

Making sense of both teachers' and students' MW in classroom opens a reflexive space for the teacher. Discussing the way teachers understand students' MW in the previous section, we have seen how they recognize similar conditions for the phenomenon to occur and attribute negative value to it. MW is not just a *students' things*, it is a universal phenomenon. By acknowledging this, teachers become aware, during the interviews, that MW signals some critical moment in teaching/learning process. Teachers know exactly when their students are inattentive and start mind-wandering, because they perfectly identify the boring and repetitive lecture parts.

T1: ...but more than one (student) was...distracted.

I: Who, for example...?

T1: For example, I kept an eye on P.43...he didn't do anything. But he told me that he doesn't understand the subject to begin with.

P.5: [...] I saw myself inside of me because I wasn't thinking about the test anymore... I didn't give a damn about it.

I put it on (the desk) and I stayed there on the chair and I remained there to fantasize...in short, alone with my thoughts.

Researcher and interviewee P.08 are in front of the video and we hear T2 that states: «the mitochondrion is a small organ...».

T2, when the lesson contains reiterated elements, is conscious of the possibility of students' mind-wandering.

T2: After few minutes, I noticed that they were beginning to get distracted... I have already told about mitochondria and so when I told about them again... some of the students started thinking about something else... For this reason, I even slowed down...and I thought about that (slowing down)

P.08: Here it is! ... (the student, watching the video with researcher points to the professor statement the moment he has a mind-wandering activity).

P.09: It is as if I heard a voice that...

I: When did you think you heard this voice?

P.09: When he talked about the structure of the eukaryotes cell and prokaryotes cell.

I: Excuse me, this is the subject of lesson... The precise moment instead?

P.09: Ah, while he was talking about mitochondria, I think...

P.10: It is as if the teacher put the mute mode and then when He says the things that you want to talk about you start concentrated on the lesson again...Ones again you heard the teacher's words.

I: Was there a moment in which that happens?

P.10: Yes, right at the beginning... when he was talking about what he had already explain...

P.11... The teacher mentioned mitochondria and an acronym and I saw a bolt in the chair in front of me (this reminds him of a film). A scene of the film in

which you can see the bolt entering a wall ...but also the lesson does not interest me.

P6 claims that his teacher (T5) arrives when he is intent on deciding which subject to choose from. So reading it again with her was useful but T5 says that she saw him spell bound. The idea that a spell bound person should be blocked and brought back to his task is very common. According to T2, a way of avoiding MW consists of constant control and monitoring strategies. For him, the teacher's posture (standing) and the kind of task influence the way students pay attention. T2, for example, in addition to lecturing, also hands out a summary sheet to be filled out by the students. This makes mind-wandering more difficult because of the demand made by multitasking: the student has to listen and, at the same time, to fill in the schedule. Students interviewed confirmed this teacher's view (Do you feel that you were thinking about something else during the lesson? P2a: I don't think one can be inattentive during the professor's lesson (T2)). In this manner, students are always involved but, as in Teachers' Refresher Courses the possibility of deliberate mind-wandering is still there as confirmed by students. P2b is not motivated toward the discipline and says that he decided to stare at the window and think about his problems (P2b: I thought about all my problems, as I told you. He knows (referring to T2) that I'm not interested in his lesson; P1: [...] I saw myself inside of me because I wasn't thinking about the test anymore ... I didn't give a damn about it. I put it on (*the desk*) and I stayed there on the chair and I remained there to fantasize...in short, alone with my thoughts).

However, all teachers think it is normal to be distracted in a test situation because they are less involved and there is a passive presence. In this manner, the concept of testing as a not learning moment but a students' evaluation emerges.

I: What about today?

T1: Yes, because I was thinking of how to organize the lesson with the students in mechanics class and, I wasn't concentrating on them.

When I call on them, no... because I write down what they say and the mistakes they make. I can't stop them because otherwise they lose the train of thought and so, I wait for the end of the interview and I tell them what mistakes they have made.

T6: In my lecturing, I didn't mind-wander but other times I did (referring to testing and cooperative learning)

Not only, testing is a moment in which teachers believe having no possibilities to change the present situation (e.g. they cannot move around or go out and they have to keep quiet and make sure that students are quiet too) and they mind-wander.

In all learning situations, teachers declare to plan future actions during this activity in the classroom. They could concern autobiographical or teaching planning thoughts.

[...] T1: I could already see the students divided into groups and I was thinking about whom to place where, what they had to do...I saw the people... I saw the actual people.

[...]I didn't see myself but I knew I was there and I communicated with them. And It was also clear (she knows) what behavior they could had had, the answers and what I must say when they behave that way because I know them and I know their reaction is going to be and so I also prepared my answers in advance.

T5: I had thought a table contents about data on productive sectors but then I want to get their opinions, listen to their questions... Even if I could have worked with fellow colleague (the math teacher). That's what I thought! I didn't have many (mind-wanderings) thought because I had to concentrate on the questions".

T3: Yes, because Saturday is a special day because the week is coming and I often read and then I have to do other things...I often think about thing that I should do during the week. But then, in realty I'm not able to concentrate on them because of the class and then when I hear a noise or something, because after all I'm there. On the other hand, I think about my outlook on personal issues and about the daily organization when I am at home.

I: Today, did you happen to think about something else?

T3: Yes...I was thinking about the move, it not something that I'm about to do but I think...the baby where am I going to put him? How can I do it? Stuff like that...Actually, I try to find the best solution and so I go back to it often.

The normative frame here has to do with the role owner in the teaching-learning situation. MW is interpreted in different ways, depending on the person involved. It seems that it is more acceptable for a teacher and less acceptable for a student.

In T7's narration, we find that mind wandering is a recursive thought expressed in images that concerns her and reappears during the lesson: her passion for antiques.

T7 "You see I often see images related my interest... I deal in modern antiques and truth antiques and others objects...and at times I happen to think about those things. If I'm deeply involved in a deal, it comes to mind and so I say: "Today, he should come..." [...] "I have to send out and email to so and so... I have to send a picture of this object... things like that..."

For T7, MW is something that has not connection with the contest, it happens like "when you plan your daily activities... so when you have done it, you don't think about any more".

I: Is emotional aspect involved in it?

T7: Yes, absolutely... thinking about these things relaxes me, they are my passion... I tell you being able to think about these things is relaxing.

T7 treats MW as a restless and re-generative moment but it isn't considered a recursive phenomenon, it is not a rumination of past sad events. For her, mind-wandering is not kinked to tiredness or boredom. She says: "the more things I do, the more things come to mind".

During a test where she claims to be thinking about other things, she says she is planning what to design for the end-of-the-year recital.

T7: "I didn't draw the toilet bowl because I thought: "If I do it, I'm going to distract them" and so took care of operation I was doing and ...but there was a series of thing that I have in mind to do...The I thought how to make the theatre set".

I: Is there something specific that trigger it?

T7: No. it was among todays' plans... it is just that then it started again when I was fiddling with todays' operations. It is a thought inside another thought (parallel) and then when everything was ready I thought of starting to work with them.

It was already planned out and while I was doing the various operations, I was drawing two numeric lines, ... I was thinking about what to do... and how to do it came to me at that moment during the test.

I: Are you bored or active?

T7: For me? I'm always active....

T7 always maintains the perception of herself and other around her. In her opinion the MW is a process that involved images and she sees herself acting in the first person.

These different MW's features and modalities, illustrated in these paragraph, show the heterogeneity of the phenomenon in individuals. Mind –wandering becomes an umbrella term for a large varieties of mental process, among which we find planning, the controfactual process connected specifically to emotional states and future affective reactions.

T4: Here (showing the video), while I was handing out the tests, P9 said: "Luckily, it is the last one (test)!" and I answered: "Luckily, it is the last one for me too... because I'm the one who has to correct them...and then I had these texts because a girl has asked me if I could read them. I realized that I was not reading them... My student (p9)'s remark (Luckily, it is the last one!) echoed in my head and so I lost contact with the text that I was reading and for a while, I didn't know where I was.

[...] There was a moment in which I got distracted and I initiated an internal train of thought. You know, I thought that with the other teacher they felt quite free, they kind of did what they wanted and there was a moment in which I got distracted and I thought...You think about those thing because it is always a bit difficult to be oneself. Because in any case, students would always prefer to have fun, to play and they are more comfortable with teacher that are that way...Instead you want them to learn something...You start thinking that maybe you are wrong and one can learn even if surrounded by confusion.

I: Do you lose perception of the class?

T4: Yes, a bit because you add things up...your strict side and your more permissive one to find a balance.

Referring to the protocol, all teachers noticed/stressed that the presence of the camera was an element that reduced their spontaneity and that of the students. For this reason, the camera was introduced 15 minutes before the video-recording activity and, as confirm by teachers. After few minutes, students seemed to forget it was there. The other aspect is the number of cotton balls given to students in order to report MW: three/four to each of them. The number of Mind-wanderings in fact could be higher but this shortcoming is overcome by giving students a sheet to fill in which they record the exact number.

Conclusions

Mind-wandering is an emerging research area in cognitive studies as evidenced by the trend of publications in recent years but it is viewed as a phenomenon at the margin of the pedagogical horizon. Thus, there is a paucity of pedagogical publications on the subject even if virtually all teachers have probably observed students while they are partaking in an "absent-minded job as if they have stopped in time" (*description of primary school pupils during a focus group*).

Basing our observation on a dynamic idea of learning and teaching processes, in this paper we analyze what happens to teachers, confirming similarities with students' MW (Dario & Tateo, 2019).

We are able to confirm that teachers' and students' attitude towards MW is negative according to the equation: attention-learning-high performance and inattention-disorder-not learning/low performance. This evaluation is guided by the normative frame of reference of the school, through which the actor involved make sense of a psychic experience that seems to deviate from the expected conducts.

As a consequence, MWs are seen as an intimate affair, hence teachers are less comfortable describing them to other people, because they have experienced the limits of social tolerance of them. In particular, the peculiar negative research approach towards MW pushed teachers to adopt strategies to limit/reduce it. In this manner, mind-wandering is a phenomenon relegated to the margin in the same way in which mistakes were seen in past decades. In fact, for a long time, teachers took a dim view of mistakes but now they tend to use them as a tool to improve teaching-learning actions.

By looking for and uncovering our errors, our mistakes, our inadequacies, and then eliminating them. This is how we improve our practical knowledge—our writing skills, our ability to draw, our tennis game—and how we improve our knowledge of the world and our understanding of other people. We are fallible, so we make mistakes. But we can learn from our mistakes. By uncovering and eliminating them, we improve our knowledge and understanding (Perkinson, 2002)

However, teachers accept their MWs during testing and group activities because they consider these activities as students' experiences where they are not personally involved. In most cases, as shown by available data, teachers' work is closely related to lecturing.

Furthermore, MW always shows:

- teachers and students consider repetitive activities and boredom a cause of MW (Singer, 1974; Philips et al. 2016), in particular, deliberate MW that could occur at the same moments in students and teachers. In this case, they prefer staying in another world instead of being in the real one;
- the teachers who declare to be active during mind-wandering, report feeling active after a MW episode: a cognitive jumpstart, this shift from here to there "revitalizes" the mind. Subjects are involved in a restless moment that is capable of improving their future performances and results.

According to these two statements, re-reading the same text or not being actively involved in a situation (the teacher that has to monitor his students during the test) move towards maladaptive mind-wandering that reduces personal involvement in the real world, but also some educational questions arise: does every educational activity where there is "re" (re-reading, re-writing, re-listening, re-drawing) favors mind-wandering? Could MW be a way of giving relevance and meaningfulness to boring and senseless individual or collective situations? Or, if MW is a common phenomenon in psychic life, what is its positive function?

In addition, the above cited interpretative analysis suggests that MW corresponds to a restless moment that permits conceptual elaborations and the emergence of affective reactions to solve states of feelings. In this manner, we question

the concept of relevance and meaningfulness which are directly linked to self-esteem and previous experiences, but also with semantic interaction with reality. MW, as an imaginative process, reminds us how, since the time of Aristoteles, imagination has played a role in memory formation and retrieval and association of ideas. Since the time of the teachers of rhetoric, such as Cicero and Quintillian, new relationships have been created between experiences and new information, generating interactive images between old ideas and new events. During mind-wanderings, teachers monitor their behaviours towards others: teachers planning their actions and relationships with students. Thus, they generate a hypothesis on how to organize their future lessons and imagine students' reactions. There is a sort of future prefiguration moved by internal states (Tateo, 2016). In fact, MW features scenarios of future goal-related activities: an important goal may spawn hundreds or thousands of brief MWs of goal-related actions (Klinger, 2009). Teachers report that recursive issues or purposes generate recursive MW and rumination but the experience of rumination is rarely linked to unhappy feelings. In teachers' mind, rumination is connected to pertinence and personality, as expressed by Singer (1966). In conclusion, as in the case of mistake, MW is an event that happens and transforms our learning experience, in particular when students have to reach a performative result. MW could be included in those psychic phenomena of imaginative nature (Brown & Tateo, 2019; Tateo, 2016) which seem to play a fundamental role in all future-oriented cognitive and affective processes, which require a systematic exploration in ecological contexts of the activity. However, the above assertions are not an attempt to justify distraction but consider MW one of the language known by the subject: thinking in terms of mind-wandering means to facilitate the re-enactment of simulation processes useful for the development of concepts and language. (Clowes e Mendonça, 2016; Goldman, 2005).

We know, for example as without an erratic movement of mind, no teacher would be able to understand the meaning of the intentionally incorrect sentences: "The Boas their prey in the jungle", moving from an external online reality (the written sentence) to an inner state able to retrieve previous reading experiences.

Hence further questions arise rather than conclusions because only a free mind, which does not jump to conclusions can be considered non-mechanical (Krishnamurti, 2010):

- How to use autobiographical narrations (teachers and pupils) to understand how the lesson, we are imparting as teachers, is interconnected with the affective and relational levels of subjects and how the organization of the action changes in its making? Mind-wandering shows us that we must teach students to ask themselves: Am I forcing myself to learn these things, while I would like to do something else? Where is my interest going while I'm here in this learning situation that doesn't involve me? What would I like to learn? How would I like to learn it? How am I restructuring the information, according to personal and original methods?
- How to indulge the erratic mind with practices that include "the method of loci" (attribution of concepts to very different places that ancient cultures used to memorize and to indulge the wandering mind: it means to associate a mental path, for example planning, to physical places) or doodling (spontaneous form of writing that redirects MW towards an organized form and favors deep learning processes because it combines the emotional states of the subject with concepts) transforming MW from useless to useful for learning?

In essence, we find it absurd not to consider mind-wandering or even worse to want to eliminate it at all costs because it is a part of our mental processes and of our imagination. Certainly it must be blocked when maladaptive (Somer, 2009) but studied and understood when it is a process of interpretation and management and a way of evaluating unexplored perspectives of our life experiences.

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Appendix 1 – Example of data analysis

Original transcript	Exploratory comments	Emerging themes
<p>I: What do you think about this protocol? What happened to you during it?</p> <p>T1: Before starting, I thought it would be worse: of being under... (observation), you know, under... so judged as teachers by you ...but then I noticed the students...they haven't done anything differently from the daily routine. At the beginning, the first time I saw that they were a bit (<i>nervous</i>)...but then they were calmed down.</p> <p>(silence)</p> <p>T1: No, no, also today those who normally pay attention, did so... those who are usually distracted, didn't behave differently.... And then there are those who didn't insert (<i>cotton</i>) balls but there were many who were distracted.</p>	<p>Katia's perception of the protocol and interview. She stresses the idea attention-learning-performance and inattention-disorder-not learning.</p> <p>There is not difference between distraction and inattention.</p> <p>Mind-wandering is a form of distraction</p>	<p>Teachers' common idea: attention-learning-performance and inattention-disorder-not learning.</p> <p>Referring to Mind wandering as a phenomenon to be reduced</p>
<p>I: Could you explain me that?</p> <p>T1: For example, I kept an eye on F.D...he didn't do anything. But he told me that he doesn't understand the subject to begin with.</p>	<p>Read F. D.'S interview</p> <p>Example of a student's deliberate mind-wandering motivated by learning-teaching situation</p>	<p>Elements in common between teachers and students' narrations.</p> <p>Deliberate mind-wandering</p>
<p>T1: Then, B. that he never hasn't anything with him and always turns in not filling tests. He didn't insert a cotton ball but he had to insert an entire bag because he didn't pay attention at a single moment. at one... and I saw the others but they were normal then I don't know if they were looking at the test but thinking to something else.</p> <p>Ah...Then there is M. R. who distracted also when he is drawing...You see him living in another world.</p> <p>T1: Then, B. who never does anything, turns in a blank sheet of paper. He didn't insert a cotton ball while he should have inserted an entire bag because he didn't pay attention for a single moment... not even one... and the others behaved normally, however I didn't know if they were looking at the paper were thinking about something else.</p> <p>Ah...Then there is M. R. who is distracted even when he is drawing...You can see that he is living in his own world.</p>	<p>She reflected on the necessity to give students more balls.</p> <p>She uses a common explanation: living in another world</p>	<p>A methodological reflection on the necessity of giving more than three balls to each students</p> <p>Attribute to mind wandering the idea of "living in another world"</p>
<p>I: Did you happen to think about something else?</p> <p>T1: Yes, while they were doing the test, I was thinking about the work with the mechanics course, so I wasn't paying attention...paying attention on them. But, if I can say, when we attend a training course... Some courses are so boring...I wander...So, everyone wanders with his mind.</p> <p>I: What about today?</p> <p>T1: Yes, because I was thinking of how to organize the lesson with the students in mechanics' class and, I wasn't concentrating on them.</p> <p>When I call on them, no... because I write down what they say and the mistakes they make. I can't stop them because otherwise they lose the train of thought and so, I wait for the end of the interview and I tell them what mistakes they have made.</p>	<p>She associates MW with other life events: Teachers' Refresher Courses and Sunday Mass.</p> <p>This teacher has a deliberate mind-wandering, during these events.</p>	<p>Boredom and repetitive activities generate mind-wandering episodes and in particular deliberate MW.</p>

Original transcript	Exploratory comments	Emerging themes
<p>I: Do you ever happen to have any? T1: Yes many...during Mass... but during the sermon, I mean... the first five minutes, maybe yes (referring to her attention span) ..., then it is interesting maybe even ten minutes otherwise... I have many (referring to MW).</p> <p>I: Is there a recurring mind-wandering? T1: Ah...when I put in in my head to do a chore at home, I keep hearing a voice that every second says to me: "Katia, you must do that chore ...but I swear... A times I invent chores like for two consecutive times, I have renovated the house window, I mean, it a men's job. In such a hard job, but if I put it into my head to do something...I may be talking to you but I'm really thinking about that job. It is like when you wake up in the morning and a tune pops into your head and it stays there the whole day long.</p> <p>I: Does it happen at school? T1: No, because i have one lesson after another I: When you have a mind-wandering episode? Do you know where you are? Do you know what's happening around you? T1: In my case, for instance, it happens while ironing and then I start thinking and then I really find myself somewhere else. I'm in the basement ironing...It's just me and Lilly (her dog) but if the bell rings, I don't ever hear it. Perhaps, when I was listening to the sermons, I didn't notice if the lady next to me, turned or you look but you only see the emptiness... You look into the emptiness...</p>	<p>A personal issue or purpose generate recursive mind-wandering.</p> <p>T1 refers that MW is not common for a teacher in particular because he is always involved in activities without restless.</p> <p>She fixed the emptiness</p>	<p>Recursive mind wandering is generated by personal issue.</p> <p>Fixation: sign of MW</p>
<p>I: Were you aware of looking in the emptiness? Yes, I'm starring at the emptiness but If you asked me what kind of coat was the woman in front wearing, I wouldn't know how to answer. In that moment I wasn't attentive. But it is normal, isn't it? I: Were you aware that you were looking into the emptiness? T1: Yes, I was looking at people but if you asked me what kind of coat the woman in front was wearing, I wouldn't have known what to answer. In that moment I wasn't attentive... But it is quite normal, isn't it?</p>	<p>Mind-wandering is an example of absentminded person when he lost the perception of what is doing.</p>	<p>Maladaptive mind-wandering</p>
<p>I: In your opinion, do you think there is an emotion that has triggered this thought? T1: Yes, yes I: Maybe the Mass? T1: Certainly not the Mass. It happened in a period in which I was having some serious problems, and I remember this scene: "I was at the supermarket, at the fish counter and I was looking towards the exit... at the supermarket...and I saw ...Then I knew that there were things around me but I was focusing on the supermarket floor and I saw this huge floor that was making me anxious...but something serious had happened at home... so it was some stuff at home, then, I had a terrible feeling, this feeling of just being overwhelmed by things around me. ...I felt that big (she indicates the small size with her hands).. Surrounding by these enormous tiles...it didn't last long...I perceived a sense of powerlessness, of helplessness...I mean, it was strange because I always have everything under control...(for me) the glass is always half full but at that moment I was beginning to see it half empty. Because a number of important had piled up...I was scared...at least a little</p>	<p>The teacher has a state of feeling and mind-wandering prepared the reaction.</p>	<p>Mind-wandering prepared the affective reaction.</p>

Original transcript	Exploratory comments	Emerging themes
<p>I: Are you at ease during your mind-wanderings? T1: Yes, I think about beautiful, funny and nice things that happen in my family...on my part I'm a positive person, so it is unlikely that I feel down but there can be some moments... I: Do you think it happened while you were more active/engaged or more tired/bored? T1: When I'm tired...Yes, when I'm tired.</p>	<p>This teacher has positive recursive mind-wanderings, not negative.</p>	<p>Recursive mind-wandering don't correspond to unhappiness.</p>
<p>I: Did you happen to think about something else? T1: Yes, while they were doing the test, I was thinking about the work with the mechanics' course, so I wasn't paying attention...paying attention on them. But, if I can say, when we attend a training course... Some courses are so boring...I wander...So, everyone wanders with his mind. I: What about today? T1: Yes, because I was thinking of how to organize the lesson with the students in mechanics' class and, I wasn't concentrating on them. When I call on them, no... because I write down what they say and the mistakes they make. I can't stop them because otherwise they lose the train of thought and so, I wait for the end of the interview and I tell them what mistakes they have made. T1: Other times, I'm giving a lecture and I think that maybe would be better to do in this manner...because maybe... they'll enjoy more if they do it this way...yes, yes... I: In this case, today, while you imagined, you imagined in words or pictures? T1: Imagines, imagines, I could already see the students divided into groups and I was thinking about who to play where, what they had to do...I saw the people .. I saw the actual people.</p>	<p>T1, during mind-wandering, plans new activities and reflects on the results of her actions on students' behaviors.</p> <p>She imagined in pictures.</p>	<p>Mind-wandering is a psychic phenomenon that permits to planning future actions.</p> <p>Mind-wandering occurs with different modalities.</p>
<p>I: Did you also see yourself? T1: No, but I knew I was there. I didn't see myself but I knew I was there and I communicated with them. And It was also clear (she knows) what behavior they could had had, the answers and what I must say when they behave that way because I know them and I know their reaction is going to be and so I also prepared my answers in advance. I: Look, were the pictures that you saw static or in movement? T1: In movement because I ordered them to come away from their desk...queue up...not everybody. only those that I intended to call were moving. The other were only silhouettes that I couldn't see. I only saw those that I knew they were moving and then the others as a whole but not as single persons. I: What did you see? T1: I saw the class. I'll call the seven most talented students and they'll pull out the names in order to... to form the team... the team order ... and then they'll call the names...they'll choose the team and names and I know almost certainly who'll choose and who'll be left behind and ...so I communicate with the seven students I have picked...the others were a group from which to choose. [...] I: When did this thought over? When I have divided them up in groups and they have started to work.</p>	<p>Again, T1 plans new activities and reflects on the results of her actions on students' behaviors. She makes use of imagination for reality testing.</p>	<p>So MW works with factual, counterfactual, hypothetical and with multimodal (image, concept, movement, etc.).</p>