Mind Wandering in the Classroom

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Abstract

Mind wandering is characterized by unintentional shifts in attention away from a primary task towards internal information. It is thought to be caused by a breakdown in executive control of working memory over the process of joining external information and internal representations (Smallwood & Schooler, 2006). Mind wandering could become detrimental in a learning situation if external information (e.g. lecture content) is no longer being consciously processed because attention has unconsciously shifted off-task (e.g. personal matters). Given that mind wandering research has been primarily conducted in laboratory settings, there is great need to demonstrate the ecological validity of this phenomenon. Examining mind wandering in the classroom could help establish the generalizability of previous findings and add to our current understanding of this phenomenon. Armed with a practical understanding, instructors may be able to intervene in the classroom to simultaneously reduce mind wandering, design more effective learning environments, and consequently, increase student productivity in the future.

*Key Words:* Mind Wandering, Classroom, Learning, Memory, Attention
Mind Wandering in the Classroom

Think back to a time when you were reading a textbook. Did your eyes keep reading the words, but your mind voluntarily drifted off to other things? Were there other times that your eyes kept reading the words on the page, yet your mind drifted off and you had no idea it happened? The first question represents the intentional choice of daydreaming (otherwise known as “tuning out”), while the second refers to a phenomenon of an unintentional attention shift called mind wandering (otherwise known as “zoning out”). At first glance these two cognitive behaviors seem only different by name; however, in this call for research, we seek to explain the phenomenon of mind wandering and propose the examination of mind wandering within the context of the college classroom.

Mind wandering is a universal phenomenon that has only recently gained popularity in psychology. It is a type of meta-consciousness characterized by unintentional shifts in attention away from a primary task towards internal information (Smallwood, Baracaia, Lowe, & Obonsawin, 2003; Smallwood, Obonsawin, & Heim, 2003). Smallwood and Schooler (2006) suggest that mind wandering occurs when there is a breakdown in executive control of working memory over the process of joining external information and internal representations. Mind wandering, in practice, is characterized by having attended to something external (e.g. a video) but having no recollection of the information of the external event. Under normal circumstances, external information (e.g., words on a textbook page) would be processed and coupled with one’s internal representations and schemas (i.e., psychological concepts of learning and memory). However, mind wandering alters the process so that when external information comes into the system one’s internal representations are over-activated and a significant amount of
attention and integration is then focused on internal information instead of the external
information being presented (see Figure 1: Smallwood, Fishman, & Schooler, 2007). It is
unknown as to what triggers the decoupling process of mind wandering and why it is a universal
phenomenon that everyone experiences at some point in time.

**Mind Wandering and Student Learning**

The recent findings in mind wandering research have shown compelling potential to
inform and improve the classroom environment. As previously noted, mind wandering is
characterized by the experience of decoupled attention, whereby attentional resources are
separated between external and internal stimuli. Without conscious awareness, individuals attend
to internal, task-unrelated thoughts. This, of course, comes at the cost of encoding information in
the external environment (Smallwood et al., 2007). While some research has unsuccessfully
sought to identify the antecedents of mind wandering, their efforts have typically been directed
toward the characteristics of tasks that induce mind wandering (Smallwood & Schooler, 2006).
Importantly for educators, this phenomenon appears to occur automatically and unintentionally,
suggesting that mind wandering can take place anywhere and at any time, including the
classroom.

Teachers are perpetually challenged with the task of gaining and maintaining student
engagement. Unfortunately, for many, this can seem like an uphill battle. Regardless of how
humorous, thought-provoking, and informative a lecture might be, some students still may not
grasp the material. Variability in learning can be reasonably attributed to things both outside of
students’ control (e.g., intelligence) as well as within (e.g., attendance, motivation). Mind
wandering represents a novel psychological explanation for why students, who are otherwise
capable of mastering the content, fail to retain information and reasonably perform on measures of classroom comprehension.

For learning to occur, it is necessary for external information to be integrated into a meaningful internal representation (Mayer, 2002). Mind wandering becomes harmful if external information is no longer being consciously processed because attention has unconsciously shifted to off-task concerns (characteristic of mind wandering). Thus, learning cannot occur. Mind wandering may potentially account for why students do not learn in seemingly conducive circumstances (e.g. humorous or interactive lectures). Researchers speculate that mind wandering applies not only in the laboratory but in educational settings (Smallwood et al., 2007). Despite the apparent need, much of the research on mind wandering has been conducted in the laboratory setting instead of classrooms. In the laboratory, most researchers have investigated mind wandering in sustained attention tasks (i.e. reading a long passage) among healthy, young adult samples (Giambra, 1995; Grodsky & Giambra, 1990; Schooler, Reichle, & Halpern, 2005; Smallwood, Fishman, & Schooler, 2007). Therefore, ecological validity had not been established for this phenomenon, which limits the ability to generalize extant findings from laboratory tasks to classrooms. However, laboratory-based research does suggest some basis for expecting mind wandering to occur in educational settings.

Research examining the outcomes of mind wandering suggests the decoupling of attention from external information is typically associated with superficial representations of the external environment, reduced quality of memory encoding, and lower task performance. Schooler, Reichle, and Halpern (2005) found that instances of mind wandering were negatively related to text comprehension when participants engaged in a reading task. This suggests that during mind wandering, participants formed superficial representations of the reading passage.
which interfered with their ability to grasp the text. Additionally, studies have found mind wandering reduces retrieval from memory in both short- and long-term circumstances (Seibert & Ellis, 1991; Smallwood, Obonsawin, Reid & Heim, 2002; Smallwood, et al., 2003). Finally, research has demonstrated that task performance is reduced during episodes of mind wandering partially because working memory resources are divided between on-task and off-task demands. As a result, individuals experience impairments in their ability to concentrate on and coordinate task-relevant information (Teasdale, Dritschell, Taylor, Proctor & Lloyd, 1995). In general, when individuals focus attention off-task, they are unable to form and encode detailed memories.

Furthermore, they are unable to devote cognitive resources to the task at hand. Through either mechanism, performance on tasks is reduced. In an educational setting, if students engage in mind wandering during important points throughout a class, they may not be (a) encoding information presented to them, or (b) able to cognitively balance the competing demands of class and off-task mind wandering. Both of these scenarios would be expected to reduce student learning and performance on subsequent assessments of learning.

A Call for Mind Wandering Research in the Classroom

The concept of mind wandering ought to seem both alluring and all too familiar to academic instructors. Clearly, the notion that individual attention may predictably drift off-task has pedagogical implications for student learning. Specifically, if mind wandering was found to be linked to student learning outcomes, this would have many implications for both how courses were designed (e.g. activities, projects) and how content is delivered (e.g. lectures, presentations). Unfortunately, our understanding of this phenomenon remains fragmented and has yet to coalesce into a coherent theoretical framework. Much of this research has been
confined to laboratory studies, consequently neglecting to examine how mind wandering naturally occurs in various settings such as classrooms (for an exception see Kane et al., 2007). Before any actionable conclusions can be drawn from a pedagogical perspective, we must first extend this research into educational settings to determine if and when mind wandering occurs in the unique context of a classroom.

We propose testing this type of research in a classroom with a traditional lecture format. The lecture should be designed so that it is more than 30 minutes in duration and does not include any videos, group work, or other classroom activities, as these could be confounding factors. We suggest that students not know the lecture topic before arriving to class – the course syllabus should only indicate “Surprise Lecture” for that day, without any assigned readings. Holding the duration, lecture style, and content constant will help preserve the internal validity of these studies.

Smallwood et al. (2008) used probes as a way to catch mind wandering in the lab when their participants advanced beyond a predetermined point in the story they were reading on a computer screen (from The Red-Headed League, Conan-Doyle, 1892/2001). When the probe occurred, the computer screen asked, "Just prior to being asked, was your attention on- or off-task?" To answer this question, participants responded by pressing T on the keyboard for "tuning out," Z for "zoning out," or O for "on-task." (Before reading the Conan-Doyle story, participants read a booklet which defined "tuning out" and "zoning out.") After completion of the probe, the next portion of the story appeared on the computer screen. Similar to this task, student mind wandering in the classroom could be measured using probes displayed on a PowerPoint presentation at predetermined times during the lecture. When the probe appears, the students should be asked to answer the following questions: (Question One) Just prior to seeing this slide,
were you paying attention? If you answered “no” to Question One, please pick A or B: A: I KNEW that I was not paying attention. or B: I was UNAWARE that I was not paying attention.

For the first question, if a student answers “yes,” it will indicate that mind wandering had not occurred because they were on task and aware of the external environment. If a student answers “no,” it may indicate that he/she was mind wandering. For the second question, if a student answers A, it will indicate that he/she was tuning out because they were aware that they were not paying attention. If instead a student answers B, it will imply that he/she was zoning out (indicative of mind wandering) and unaware that he/she had decoupled attention.

Targeting mind wandering in the classroom using this method could give instructors much more insight into the basic understanding of student cognition. Once identified in the classroom, researchers could then examine mind wandering in relation to student comprehension, retrieval performance, academic success, and many other factors. Once identified in the lecture format, other types of pedagogical methods (e.g. videos, group work, case studies) could also be tested to see if using different teaching methods leads to more or less mind wandering in the classroom. For example, do short breaks help students focus, or would they have the ironic effect of encouraging mind wandering? If mind wandering is automatic, and perhaps unavoidable, would short break periods facilitate student learning?

Locating mind wandering in the classroom setting helps to further explain and understand what mind wandering is by providing information on under what conditions it occurs. The findings have practical application for both psychology and education. Knowing the “when” of mind wandering is necessary for developing useful strategies to aid instructors in reducing the occurrence of mind wandering within their classrooms. Armed with a practical understanding,
instructors may be able to intervene in the classroom to simultaneously reduce mind wandering, design more effective learning environments, and consequently, improve student performance.
References


Thinking and seeing: Visual metacognition in adults and children (pp. 204–226).
Cambridge, MA: MIT Press.


whilst encoding information. Consciousness and Cognition, 12, 452–484.

Mind wandering as an underrecognized influence on educational performance.


demands on the experience of task-unrelated-thought. Imagination, Cognition and
Personality, 22, 13–31.

of personality and situation in the maintenance of subjective experience in a laboratory.
Imagination, Cognition and Personality, 21, 319–332.

resources. Memory and Cognition, 28, 551–559.
Figure 1. Schematic account of the contrast between the attentional coupling that accompanies successful discourse processing and the state of decoupled processing when the mind wanders. From Smallwood, Fishman, & Schooler (2007).