Athletes' self-reports on mind wandering while practicing sports: An exploratory two-study project

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This two-study project provided a brief description of athletes' experiences with mind wandering. Study 1 aimed to quantitatively examine mind wandering in sports, in terms of frequency, effects and perceived control. Therefore, 94 athletes (M_{age} = 19.51, *SD* = 1.65) answered a specifically designed 19-item questionnaire. The results suggested that mind wandering is a common phenomenon in sports, with both beneficial and adverse effects on performance. Study 2 aimed to qualitatively explore when athletes use mind wandering. Accordingly, 115 athletes (M_{age} = 22.82, *SD* = 3.61) described one recent mind wandering situation while practicing sport. A hierarchical content analysis was performed by the first author and confirmed by an external expert. The results indicated that mind wandering occurred in a wide range of situations in sport and physical activity. Nonetheless, it was also argued that future studies should more carefully define mind wandering to avoid confusion with related terms.

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This project was focused on mind wandering, a cognitive process that would include any thought that is unrelated to the ongoing task or activity, thus unrelated to the thought-eliciting situation (Klinger, 2009). Mind wandering can be intentional, for instance, when athletes bid their minds to wander and become distracted from an unpleasant concurrent experience, such as pain or boredom; or unintentional when athletes find their minds have drifted away from the present to a distant place somewhere in the present or future (Seli, Wammes, Risko, & Smilek, 2015). In regard to everyday life, mind wandering is considered to occupy between 30% and 50% of waking time (e.g., Levinson, Smallwood, & Davidson, 2012). In research, mind wandering is a thriving topic (Szpunar, Moulton, & Schacter, 2013) with 592 entries from 2010 to 2017 for a search on the topic *mind wandering* in the ISI Web of Knowledge (date: 25.02.2017). Amongst these articles there are reviews and meta-analyses (e.g., Fox, Spreng, Ellamil, Andrews-Hanna, & Christoff, 2015, Smallwood & Schooler, 2015), as well as empirical studies in a wide range of psychological domains such as education and learning (e.g., Hollis & Was, 2016), driving (e.g., Lagarde et al., 2012) and neuroscience (e.g., Mason et al., 2007). In these empirical studies, the effects of mind wandering have been explored, showing positive effects, as mind wandering might improve planning and remembering, generate new ideas or facilitate creativity; or negative effects, as mind wandering might impair comprehension, lead to poor memory encoding and performance-inhibiting distraction (see, Stawarczyk & D'Argembeau, 2016). The effects might partly depend on the content of mind wandering. To illustrate, Franklin et al. (2013) showed that interesting musings are associated with positive moods while mind wandering.

In contrast to the plethora of work in other areas of psychology and neurosciences, in sport psychology mind wandering has not yet become an established research topic. A combined search for the topic *mind wandering* and the topic *sport* in the ISI Web of Knowledge yielded 1 result (date: 25.02.2017), a conference paper on attentional training (Grosu, Grosu, Popovici, & Preja, 2015). Studies have, however, considered *mind wandering* in other ways and using other terms, such as dissociative attentional styles and irrelevant thoughts. Dissociative attentional styles, that is, athletes focusing on task-unrelated stimuli, were expected to help overcome fatigue and pain (Stanley, Pargman, &

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Tenenbaum, 2007). Moreover, irrelevant thoughts, that is thoughts unrelated to the task at hand, were recurrently related to distraction and poor performance (Englert, Bertrams, Furley, & Oudejans, 2015). Yet, in regard to fatigue and pain, actual results were contradictory. For example, Stanley et al. (2007) showed that dissociative compared to associative attentional styles were related to lower degrees of rates of perceived exertion. Conversely, Lohse and Sherwood (2011) showed that external focus of attention compared to internal focus of attention are related to lower perceptions of fatigue and pain, regardless of the associative/ dissociative dimension.

Taking into consideration the dearth of studies on the impact of mind wandering on sport performance, the purpose of this two-study research project was to inquire into student athletes' experiences related to mind wandering. Specifically, Study 1 quantitatively examined mind wandering in sports, in terms of frequency, effects and perceived control. Moreover, to compare mind wandering within sports to a second performance-related context, in which mind wandering has frequently been studied, athletes' opinions on mind wandering in academic training were also explored (e.g., Farley, Risko, & Kingstone, 2013). Based on previous studies (see, Szpunar et al., 2013), mind wandering was expected to have a detrimental effect on academic learning.

Further, Study 2 qualitatively explored situations in which athletes have used or experienced mind wandering. It was thought that knowing when mind wandering occurs could constitute a first step in studying its effects in sports and in developing interventions aimed at gaining control over mind wandering. The ultimate goal of this line of research would clearly be to help athletes avoid dysfunctional mind wandering, or voluntarily engage in mind wandering when beneficial effects are expected.

Study 1

Method

Participants and procedures. 94 Caucasian athletes (75 males and 19 females, M_{age} = 19.51, SD = 1.65) volunteered to participate in this study. At the time of the data collection, they all recognized themselves to be actively engaged in one or more sport activities, mainly, outside the university. Sport activities were described as activities that involve rigorous physical exertion or the use of relatively complex physical skills (Coakley, 2004). They were also attending Year 1 and Year 2 modules related to sports and physical activity in different local universities, in which they were invited, verbally by their lecturers, to attend a lecture on thought processes involved in sport performance. Attendance was completely voluntary and extracurricular. In these lectures, mind

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wandering was defined ("Mind wandering includes any thought that is unrelated to the ongoing task or activity, thus unrelated to the thought-eliciting situation [Klinger, 2009]"), and described ("Mind wandering can be described as a shift in thoughts away from a task or the external environment to internal, self-generated thoughts [Smallwood & Schooler, 2015]"), but neither the frequency of occurrence nor the expected effects of mind wandering were discussed. After the lectures, all students were invited to answer a brief questionnaire, which consisted of an informed consent form and short questions regarding their use of mind wandering in sport and in their academic training. Only three students refused to participate due to time constraints. A total of five lectures were held, with up to 20 students attending each lecture. Completion time of the questionnaire ranged between five and 10 minutes.

Measures. The questionnaire was developed specifically for this study. It consisted of 19 items, grouped in four parts: control over, frequency of, general effects of, and specific effects of mind wandering. The items and the response scales can be consulted in Table 1. The questionnaire was designed based on the literature in mind wandering and tested consecutively on 8 athletes similar to the participants of the study. During these test administrations, the presentation and wording of the questionnaire was adjusted. The test–retest reliability was subsequently examined with 40 university athletes (29 males and 11 females; M_{age} = 20.10, SD = 1.57) with a two-week interval between test and retest. It was used to check the stability of the questionnaire across time. The intra-class correlation with 95% CI using a two-way random model (intra-class correlation coefficient [ICC]) was calculated, taking scores of .81 or above as excellent, .61–.80 as good, .41–.60 as moderate and .40 or below as poor (Nunnally & Bernstein, 1994). ICC scores of all 19 items ranged between .816 and .943, and were, consequently, estimated as excellent.

Data analyses. Data were analysed with the Statistical Package for Social Sciences (Windows version 18.0; SPSS Inc, Chicago [IL], US). First, descriptive statistics for each item were calculated, then bivariate correlations between all items were analysed using Kendall's tau-b coefficient. Finally, the frequency and general effect of mind wandering was compared between sport and academic training, using paired-samples *t*-tests.

Results

Descriptive data can be seen in Table 1, and correlations in Table 2. It was remarkable that the participants gave higher ratings to their problems controlling mind

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wandering than their abilities to exert control over it; receiving the lowest scores the ability to avoid mind wandering and to elicit a desired content. Furthermore, correlations of perceived difficulty to control mind wandering while being bored showed several interesting correlations: it was positively related to difficulties in avoiding a certain unwanted mind wandering content, to the frequency of mind wandering during classes, and to the idea that mind wandering causes frustrating distraction; and negatively related to both frequency and effects of mind wandering in sport training as well as competition. Lastly, it was noticeable that all general effects of mind wandering (in training and competition and in classes and exams) correlated positively with each other.

Comparing the frequency and general effects of mind wandering between sports and academic training, paired-samples *t*-tests showed that, according to participants' answers, mind wandering was more frequent in training than in competition ($t_{88} = 2.34$, $p = .021$), in class than in exams ($t_{84} = 10.13$, $p < .001$), in class than in training ($t_{91} = 4.29$, $p < .001$) and in competition than in exams ($t_{81} = 3.11$, $p = .003$). Further, according to the participants' answers, mind wandering was more beneficial in class than in exams ($t_{80} = 3.62$, $p = .001$), in training than in class ($t_{85} = 5.58$, $p < .001$), and in competition than in exams ($t_{74} = 7.90$, $p < .001$). Differences in effect between training and competition were not significant ($t_{82} = 1.38$, $p = .170$).

Table 1. Study 1: Descriptive data of athletes' use of mind wandering in sports and in academic training

Parts and items	Missing	Statistically valid		Frequencies of responses				*M*	*SD*
Part I: Control over MW in sports	N/A	Valid		Incorrect	Somewhat correct	Quite correct	Complete-ly correct		
My mind starts wandering voluntarily	0	94		18	37	30	9	2,32	0,89
I can avoid MW voluntarily	0	94		32	43	15	9	1,90	0,82
I can elicit a desired content of MW	0	94		38	38	17	1	1,80	0,77
I sometimes can't avoid MW about an unwanted content	0	94		9	32	34	19	2,67	0,91
I have difficulties controlling MW with intense emotions	0	94		21	23	35	15	2,47	1,01
I have difficulties controlling MW when bored	0	94		6	18	42	28	2,98	0,87
Part II: Frequency	N/A	Valid	Never	Almost never	Sometimes	Frequently	Almost always		
How often does your MW during sport training	1	93	3	22	50	13	5	1,95	0,85
How often does your MW during competition	5	89	11	26	32	11	9	1,79	1,13
How often does your MW during university classes	1	93	1	11	33	38	10	2,48	0,88
How often does your MW during university exams	6	86	19	34	20	11	2	1,34	1,04
Part III: General effects	N/A	Valid	Very detrimental	More - than +	Equally - and +	More + than -	Very helpful		
During sport training, MW is generally …	7	87	10	24	32	19	2	2,76	1,00
During competition, MW is generally …	10	84	12	30	25	14	3	2,60	1,04
During university class, MW is generally …	1	91	27	41	19	3	1	2,01	0,86
During university exams, MW is generally …	12	82	43	28	9	2	0	1,63	0,78
Part IV: Specific effects in sports	N/A	Valid		Never	Sometimes	Frequently	Almost always		
In sports, MW is a helpful distraction	0	94		4	44	40	6	2,51	0,68
In sports, MW is a detrimental distraction	0	94		9	44	36	5	2,39	0,74
In sports, MW can elicit helpful emotions	0	94		5	46	35	8	2,49	0,73
In sports, MW can elicit detrimental emotions	0	94		11	64	18	1	2,10	0,59
In sports, MW can lead to sudden insights	0	94		11	55	24	4	2,22	0,71

Note. MW = mind wandering/ mind wander. N/A = an option given to the participants to opt not to answer, either because the question does not apply to them (e.g., someone who does not compete), or because they find themselves incapable of providing an answer.

Table 2. Study 1: Correlations between perceived control, frequency, and general and specific effects of mind wandering

		Part I: Control over MW in sports					Part II: Frequency				Part III: General effects				Part IV: Specific effects in sports				
Item		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Perceived ability to start MW	**,19**	**,22**	-,01	,00	-,09	-,03	,03	,07	**,20**	,02	,01	,09	,07	-,08	,10	**,20**	,04	,13
2	Perceived ability to avoid MW		**,39**	**-,22**	-,07	**-,21**	-,04	,00	-,08	,06	**,29**	,07	,05	**,22**	,11	-,02	**,21**	,08	,11
3	Perceived ability to elicit desired MW contents			-,07	-,05	**-,21**	,07	,12	-,05	,07	,16	,10	**,25**	,19	**,20**	-,16	**,29**	,10	**,19**
4	Problems to avoid unwanted MW contents				,11	**,31**	-,10	-,14	,11	,05	-,10	-,09	-,05	**-,20**	,09	**,29**	,07	-,03	,01
5	Problems to control MW with intense emotions					,14	,04	,12	,15	,05	-,04	-,05	,06	-,01	,03	**,18**	,11	,13	,07
6	Problems to control MW while bored						**-,19**	**-,23**	**,25**	,16	**-,26**	**-,27**	**-,21**	-,16	-,04	**,29**	-,07	,00	-,13
7	Frequency of MW during sport training							**,58**	,00	**,23**	,18	,17	**,21**	,07	,07	-,15	**,30**	,01	,14
8	Frequency of MW during sport competition								,10	**,19**	**,26**	**,28**	**,32**	,14	,00	**-,20**	**,22**	,00	,10
9	Frequency of MW during class									**,34**	-,18	-,10	-,01	-,02	,11	**,24**	,02	,14	-,13
10	Frequency of MW during exams										-,09	-,17	,05	,18	-,03	**,24**	,09	,12	-,04
11	Effects of MW during sport training											**,52**	**,21**	**,22**	**,19**	**-,21**	**,21**	**-,21**	**,21**
12	Effects of MW during sport competition												**,30**	**,34**	,07	**-,27**	,15	**-,23**	,18
13	Effects of MW during class													**,30**	,02	**-,33**	,14	-,03	,16
14	Effects of MW during exams														-,04	-,11	,01	-,04	**,21**
15	MW is a helpful distraction															,02	**,37**	,04	**,31**
16	MW is a detrimental distraction																-,02	**,30**	-,12
17	MW can elicit helpful emotions																	-,01	**,30**
18	MW can elicit detrimental emotions																		**,21**
19	MW can lead to sudden insights																		

Note. Correlations $r \geq |0{,}19|$ are significant ay $p < ,05$; correlations $r \geq |0{,}25|$ are significant at $p < ,01$. To simplify comprehension, significant correlations were flagged with bold letters. MW = mind wandering

Discussion

The purpose of Study 1 was to describe quantitatively athletes' use of mind wandering in sport. University athletes were selected for this study, to compare between sport and academic training some aspects related to mind wandering. The results of Study 1 suggest that athletes' minds wanders, especially in training, but also in competition. Compared to academic training, mind wandering in sport occurs less than in class, but more frequently than in exams. Moreover, the effects of mind wandering in sports were rated more beneficial compared to academic training. Accordingly, previous studies underlined that the detrimental effects of mind wandering on performance are particularly relevant in educational settings (Hollis & Was, 2016).

With reference to the specific effects of mind wandering in sports, mind wandering seems to be related to facilitative distraction and beneficial emotions, as well as to detrimental distraction and debilitative emotions. Previous research suggested that dissociative attentional styles, which include mind wandering, could help overcome fatigue and pain (Birrer & Morgan, 2010), whereas irrelevant thoughts, especially in cognitively demanding tasks (Hollis & Was, 2016), could lead to detrimental distraction (Englert et al., 2015). Lastly, mind wandering could lead to sudden insight, as suggested previously by Christoff (2012). Another mechanism by which mind wandering could aid performance, is by assisting at acquiring specific abilities. Mind wandering is linked to the consolidation and re-consolidation of memory, in the way dreaming is (Smallwood & Schooler, 2006), and therefore, it could be related to the acquisition of skills and experience in sports.

Lastly, athletes seem to perceive greater difficulties than abilities with regard to the control of mind wandering. Difficulties were deemed greatest when they experience boredom, whereas the ability to start mind wandering voluntarily was the highest ranked.

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In this regard, mind wandering can be subdivided into intentional and unintentional forms of mind wandering (Seli et al., 2015). Intentional mind wandering would be controlled by the athlete; whereas unbidden mind wandering would occur unintentionally. In educational settings both forms of mind wandering have been shown to mediate between motivation and performance, affecting the latter negatively (Seli et al., 2015). Yet in sport, the distinction between intentional and unintentional mind wandering could account for the different effects mind wandering exerts over performance. Supporting to this suggestion, Table 2 shows that the perceived ability to control mind wandering (i.e., intentional mind wandering) is positively related to the beneficial effects on attention, emotions and insight, whereas the difficulties to control mind wandering (i.e., unintentional mind wandering) are related positively to dysfunctional distraction.

With regard to methodological considerations that ought to be taken into consideration in this study, a relatively unexplored phenomenon in sports was targeted, and therefore, the investigation was expected to serve as a point of departure. For example, the questionnaire was developed specifically for this research, whereas validated sport specific questionnaires on mind wandering should be developed and used in future studies. To date, there are scales for overall frequency of mind wandering (Mind Wandering Questionnaire [MWQ]; Mrazek, Phillips, Franklin, Broadway, & Schooler, 2013), as well as the use and experience of deliberate and spontaneous mind wandering (Mind Wandering-Deliberate [MW-D] and Mind Wandering-Spontaneous [MW-S] scales; Carriere, Seli, & Smilek, 2013). With regard to the former, the MWQ was developed specifically for academic contexts (e.g., “I mind wander during lectures of presentations”). With regard to the latter, the MW-D and MW-S are task-unspecific (e.g., “I allow my thoughts to wander on purpose”) and their development and validation have, to the best of the authors’ knowledge, not been published. Yet, both scales have repeatedly been used in subsequent research (e.g., Seli, Carriere, & Smilek, 2015; Seli, Carriere, Levene & Smilek, 2013). Overall, there is a need to adapt previous scales to the sport context, or to develop new sport specific mind wandering scales for sport and to forward evidence regarding their validity. Further, this study relied on the accuracy of the participants’ metacognition. Nonetheless, such procedures provide access to cognitive activation and metacognitive knowledge that could not be obtained through other methods (Guerrero, 2005).

Despite these methodological considerations, Study 1 confirmed that mind wandering is used or experienced in sport. Further, athletes recognized both facilitative

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and debilitative effects of mind wandering. Consequently, the effects of mind wandering in sport are ambiguous, whereas research has shown that mind wandering in academic contexts is mainly detrimental. Furthermore, mind wandering is not only related to sport performance, but also to psychological well-being. Mind wandering is closely connected with negative mood, insofar as sadness tends to precede mind wandering and mind wandering predicts feeling worse if its content is negative (Poerio, Totterdell, & Miles, 2013). Therefore, it was concluded that it would be of relevance to explore under which circumstances mind wandering is facilitative or debilitative for performance in sports. To this end, a first step consisted of examining when the athletes' minds wander in sport.

Study 2

Study 2 was aimed at exploring the situations in which mind wandering is used or experienced by athletes. On this behalf, a qualitative approach was chosen to explore a wide range of possible situations and determinants. In comparison to Study 1, a similar group of participants was selected to complete the exploratory information gathered through the quantitative methods used. In Study 1, athletes reported using mind wandering in sport training and competition, with both facilitative and detrimental effects for performance. Therefore, it is believed that knowing *when* mind wandering occurs would establish the foundations to test the effects of mind wandering in different sport settings, and to develop interventions aimed at controlling the occurrence of mind wandering.

Method

Participants and procedure. 115 university athletes (72 males and 43 females, M_{age} = 22.82, SD = 3.61), similar to those in Study 1, volunteered to participate in Study 2. At the time of data collection, they were all actively engaged in one or more sport activities. They were all enrolled in courses at local sport, life and health science faculties. They were invited to a lecture on thought processes involved in sport performance, identical to the lectures held in Study 1. After the lecture, they were invited to participate in a brief study on mind wandering. They were told that they had to stay in the classroom providing descriptive data and answering one question, for about 10 minutes. Those athletes who agreed to participate, signed the informed consent form and answered the following question: *can you remember and describe a situation, within the past week, when your mind tended to wander during sport practice?* The participants were asked to describe the most significant situation they could remember, with sufficient detail that the

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researchers were able to imagine it. They were also told not to give any answer, if they could not remember or explain a situation.

Data analysis. Data were analyzed qualitatively using hierarchical content analyses following guidelines outlined by Sparkes and Smith (2014), who noted that developing general knowledge is included amongst the strengths of this method. Step 1 consisted of immersion: all answers were read five times, in a period of three months, by the first author. In Step 2, emergent themes were searched for, analysed and labelled for each participant's answer. In Step 3, these themes were ordered and connected. Similar themes were clustered into meaningful categories, which seemed to connect and fit together. Afterwards, these categories of sub-themes were classified into larger, more inclusive higher-order themes. Step 4 consisted of cross-checking. The first author went back to the original answers and checked and verified that all participants' ideas and themes were represented in the cluster. In Step 5, which refers to confirmation, an external researcher, with expertise in cognitive processes and experience in qualitative research, was contacted to review the analyses. Finally, the last step consisted of presenting a table (Figure, 1) including all sub-themes and higher-order themes. It is important to note that, despite counts of themes are offered, these do not indicate the importance of each category (Sparkes & Smith, 2014).

Results

The participants in this study described 115 situations in which they remembered experiencing mind wandering (see Figure 1). Most situations referred to sport, yet some also referred to other physical activities, including endurance tasks such as running, cycling or swimming; outdoor activities such as climbing and hiking; and yoga and body balance. In sports, the situations the participants described included competition and training. In competition, specifically, mind wandering seemed to occur foremost before the game, while winning or during breaks. For example: "Before the game when we all gather, and the coach starts his pre-game talk. I disconnect and don't pay attention to what he's saying; sometimes I think about a song, or how I am going to celebrate a goal."

During training, mind wandering seemed to occur mainly while the coach was giving a talk; in physically demanding or warm-up tasks; and together with experiences of boredom or fatigue. For example: "I find myself distracted, especially in long exercises where external events appear and grab my attention, so that I'm no longer focused on the task. Under these circumstances, it affects me negatively. Moreover, in situations like exercises with high physical demands, mind wandering helps me not to think about the

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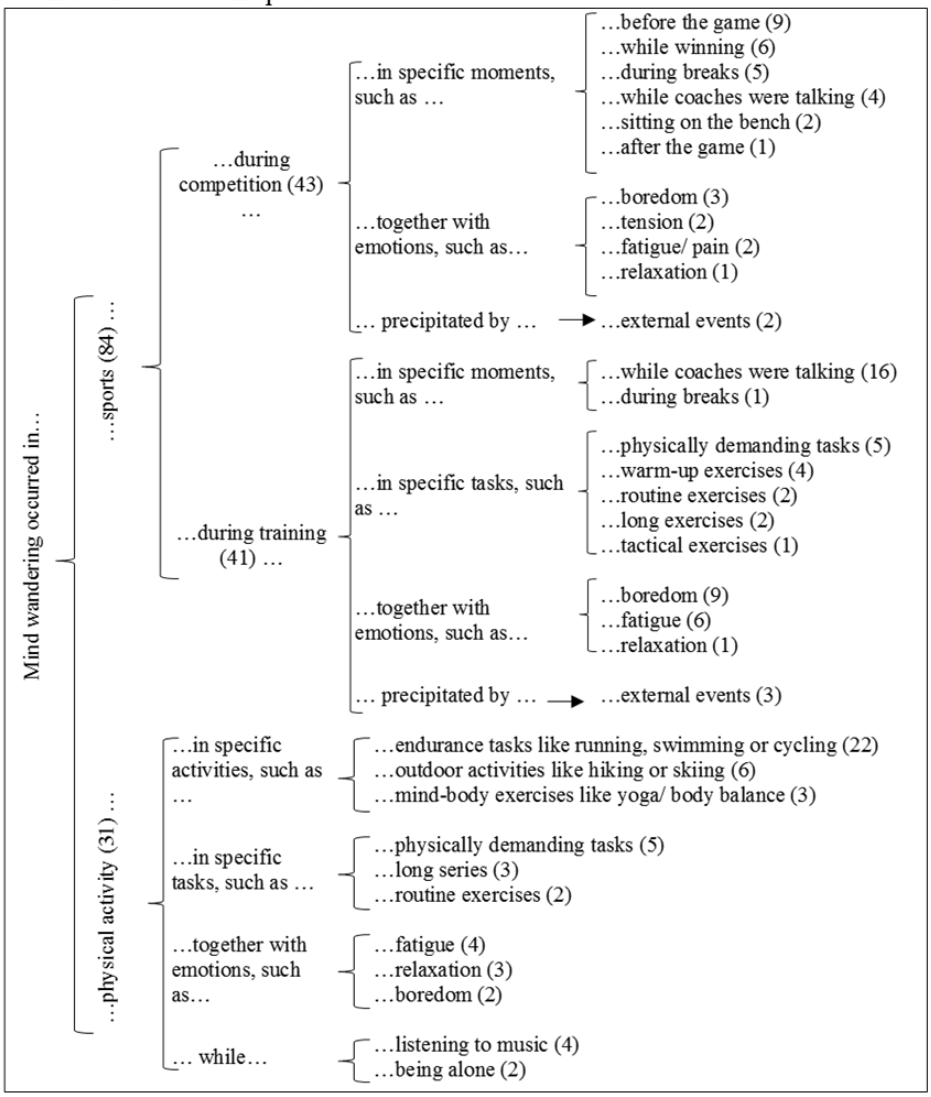
exercise and not to feel fatigue or pain. So, mind wandering can have positive and negative effects." Nonetheless, mind wandering is also linked to external events in the life of the athletes, which distract athletes from their sport participation. For example: "It happens to me, while training, when I have something very important that same day or the next, for example an exam I have to study for."

Figure 1. Results of the hierarchical content analyses in Study 2 on *when* mind wandering occurred or was used in sports.



During physical activity, mainly endurance tasks, mind wandering seemed to occur in physically demanding tasks; together with the experience of fatigue, relaxation and boredom; and while listening to music or being alone. For example: "When I take my bike to the mountains I often engage in mind wandering. Especially when I have to climb, I think about things other than cycling, which helps me forget the suffering and fatigue."

It is obvious from the last example that mind wandering could be used voluntarily to benefit the athlete. Some of the participants' answers (n = 17) referred to intentional

mind wandering. In spite of not being explored explicitly in this study, it is worth noticing that intentional mind wandering was identified in situations in sport (n = 10), both competition (n = 6) and training (n = 4); and in physical activity (n = 6), especially in endurance tasks (n = 5) with high physical demands (n = 2) when athletes experienced fatigue (n = 3).

Discussion

The purpose of Study 2 was to explore when athletes used mind wandering. From their answers, it could be inferred that mind wandering occurred especially in situations where little cognitive implication was required: waiting for a competition to start, during breaks or sitting on the bench, and while winning comfortably; in physically demanding or warm-up exercises, and during long routines; and while coaches were talking. This finding would be in line with the revision on mind wandering undertaken by Smallwood and Schooler (2006), who stated that mind wandering is more likely to occur in undemanding, as opposed to demanding, tasks. Furthermore, mind wandering is also more likely to increase as performance in certain, non-fluency tasks becomes more skilled.

In this study, mind wandering was often associated to specific emotions, all of which are characterized to be of low arousal (Latinjak, 2012): fatigue, relaxation and, most of all, boredom. In regard to fatigue, evidence from sport research on the effects of mind wandering on fatigue is ambiguous. On the one hand, a dissociative attentional style (could be mind wandering) has been shown to help overcome fatigue and pain (Birrer & Morgan, 2010) by restricting the influence of sensory information from the body (Hutchinson & Tenenbaum, 2007). On the other, contradicting intuitive logic, findings from some studies evidenced that it was associative (i.e., not mind wandering), and not dissociative, strategies which led to better performance and, most importantly, lower perceived rates of exertion during high intensity sport tasks (e.g., rowing; Connolly & Janelle, 2003). Moreover, athletes experience severe difficulties to maintain task-unrelated thoughts (could include mind wandering), even when asked to do so, as they reached volitional exhaustion (e.g., Garcia, Razon, Hristovski, Balagué, & Tenenbaum, 2015). With regard to boredom, a recent study has shown that exercisers with a tendency to associative attentional styles (not mind wandering) show significantly higher levels of intrinsic motivation and autonomous types of extrinsic motivation, whereas exercisers with a tendency to dissociate (could include mind wandering) show significantly higher degrees of controlled types of extrinsic regulation and amotivation (Jones, Karageorghis,

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Lane, & Bishop, 2015). Controlled types of extrinsic regulation and amotivation have been shown to be positively linked to boredom (Álvarez, Balaguer, Castillo, & Duda, 2009).

According to the present study, during physical activity, mind wandering is also linked to music. In sports, several researchers have often explained the ergogenic effects of music by its ability to draw attention externally away from the fatiguing task (e.g., Jones, Karageorghis, & Ekkekakis, 2014). For instance, Jones et al. showed that provoking dissociative attentional styles (could be mind wandering), by means of music, can positively affect enjoyment in a cycling task at intensities lightly above the ventilatory threshold.

In all, contradictory evidence exists on athletes' ability to engage in mind wandering in acute states of fatigue, and on the effects of mind wandering on performance. One way to approach the controversy is by acknowledging the conceptual ambiguity involving mind wandering. Despite being related ideas, mind wandering is not equal to task-unrelated thoughts or stimulus-independent thoughts (e.g., Smallwood & Schooler, 2006), which are both part of dissociative attentional styles. In this project these minor, yet significant, details have not been sufficiently taken into consideration. The responses of the participants in both studies might have been related to either intentional or unintentional mind wandering. For example, having one's mind wander to an alternative reality is not the same as thinking intentionally about a song to get distracted from pain. This is a mayor limitation of this study that future research needs to overcome by considering more carefully the conceptual delimitation of each of the concepts related to mind wandering and attentional dissociation.

Other limitations of Study 2 are related to data collection and analysis. Athletes were asked to recall a vivid memory of mind wandering. When presenting the task to the participants, efforts were made to ensure that only situations were reported which actually occurred. Despite these efforts, participants might have accessed biased memory. Moreover, the hierarchical content analysis chosen had several weaknesses (Sparkes & Smith, 2014). Most importantly, the results lacked depth and subtle nuances and contradictions might have been overseen. For instance, two participants referred to the use of mind wandering while running, and their responses were categorized accordingly. Yet, one participant stated that mind wandering occurred "half the time, because I was getting tired (…) and I think about other things to get distracted from pain", whereas the other noted that her mind wandered "throughout the entire time the activity lasted." It

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should be acknowledged that the purpose of this study was to offer general knowledge, and to this end hierarchical content analysis was selected. The results of this study offered a general overview on when athletes' minds wander, yet each athlete's singular experience was diluted by the analysis used.

General Conclusion

The results of this project suggest that mind wandering is part of sport, as occurs in other areas of daily life. Accordingly, mind wandering occurs in a wide range of situations in sport and physical activity. Common features of many situations involved physical inactivity while coaches were talking, low arousal emotions, both positive and negative, and fatigue. Further, mind wandering can affect performance both positively and negatively, and athletes' can exert a certain control over their wandering minds. However, the results also indicate that the participants have reported both intentional and unintentional mind wandering, without taking into consideration conceptual differences between them (Seli et al., 2015). Taking together the results of this brief study and the evidence from general psychology, the emergence of a line of research on mind wandering in sports would be beneficial as it outlines when mind wandering occurs, under which circumstances and by which means mind wandering aids learning and performance, and how to teach athletes to use mind wandering in their favor and to avoid mind wandering when it leads to frustrating distractions. Finally, this line of research on mind wandering would also benefit from links to psychological health and well-being, since outside of sport the content of mind-wandering has been related to negative mood (Poerio et al., 2013) and the control over mind-wandering to failure of executive control (McVay & Kane, 2010), especially in relation to psychopathological symptoms such as attention-deficit/hyperactivity disorder (e.g., Karatekin, 2004) or dysphoria (e.g., Smallwood, O'Connor, & Heim, 2006).

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