

# Development and preliminary validation of the Sport Situation Attentional Questionnaire

Maxime Mastagli, Jean-Philippe Hainaut, Aurélie van Hoye, Benoît Bolmont

### ▶ To cite this version:

Maxime Mastagli, Jean-Philippe Hainaut, Aurélie van Hoye, Benoît Bolmont. Development and preliminary validation of the Sport Situation Attentional Questionnaire. International Journal of Sport and Exercise Psychology, 2021, 20 (3), pp.849-871. 10.1080/1612197X.2021.1919741. hal-03217553

## HAL Id: hal-03217553 https://hal.science/hal-03217553

Submitted on 9 May 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



#### Development and Preliminary Validation of the Sport Situation Attentional Questionnaire

Journal:	International Journal of Sport and Exercise Psychology
Manuscript ID	RIJS-2020-0130.R2
Manuscript Type:	Review
Keywords:	attention, concentration, distraction, sport, physical education, psychometric scale

## SCHOLARONE<sup>™</sup> Manuscripts

Maxime Mastagli (1) Jean-Philippe Hainaut (1) \* Aurélie Van-Hoye (2) Benoit Bolmont (1)

(1) 2LPN : Laboratoire Lorrain de Psychologie et de Neurosciences de la dynamique des comportements, Université de Lorraine (2) APEMAC : Adaptation, Mesure et Evaluation en Santé. Approches Interdisciplinaires, Université de Lorraine

\* Corresponding Author

#### 1 Development and Preliminary Validation of the Sport Situation Attentional

#### 2 Questionnaire

#### 3 Abstract

Sport participants' ability to be concentrated and ignore distractors has been recognized as a crucial cognitive skill for optimizing cognitive and motor learning. To date, no instrument enables to assess concentration and distraction during a sport situation. This paper aimed at developing and validating the Sport Situation Attentional Questionnaire (SSAQ) among French sport participants. Study 1 developed items measuring the level of concentration and distraction. Content validity was assessed with a panel of experts, and by using cognitive interview with ten sport sciences students. Study 2 included 164 sport sciences students, and explored the factor structure of the questionnaire. Exploratory factor analysis refined the scale to 18 items and supported a four-factor model: concentration on the task, concentration due to the teacher, distraction away from the task, and distraction toward the teacher. Study 3 included 216 sports sciences students and confirmed the factor structure. Results showed satisfactory internal consistency, convergent and divergent validity, as well as gender invariance. The relationships between SSAQ factors and state anxiety subscales supported concurrent validity. Study 4 included 481 high school students and supported a four-factor model, using confirmatory factor analysis. Results also supported the convergent, divergent validity and reliability of the SSAQ. Combined, these studies provided preliminary evidence to support the psychometric properties of the SSAQ, a questionnaire that could be used to assess sport participants' perceived concentration and distraction during a sport situation.

Keywords: Attention, concentration, distraction, sport, physical education, psychometric scale

#### 27 Introduction

The ability to be attentive has been widely regarded as a major prerequisite in motor learning (Wulf & Lewthwaite, 2016), whether in a sport (Moran, 2016) or an educational context where physical activities are taught (Standage et al., 2005). However, sport participants can experience difficulties in turning their attention on sport situation (Maldonado et al., 2019; Moran, 2016). Less is known on how to optimize attention during a sport situation. To our knowledge, in comparison to the flourishing literature in cognitive and clinical psychology on attention, research evidences, especially on the measurement of attention during a sport situation, are sparse. Researchers have analyzed attentional processes through three kinds of measures (Calmels et al., 2004): (1) behavioral (e.g. time reaction; Posner, 1980), (2) physiological (e.g. pupil dilatation; van der Wel & van Steenbergen, 2018), or (3) self-reported measurement (Calmels et al., 2004). These methods have been applied to laboratory situations. However, behavioral and physiological measurement can hardly be implemented in ecological situations such as a sport situation. Thus, the purpose of the present paper was to develop and validate a self-reported scale, to measure attention during a sport situation. The concept of attention entails a variety of interconnected processes (Ocasio, 2010). At least three distinct forms of attention have been identified: attentional vigilance, selective attention, and executive attention (Ocasio, 2010). Based on these three forms, the concept of attention in sport has been used loosely to express performer's concentration (Calmels et al., 2004). Concentration was defined as the ability to focus on one source of relevant information while ignoring distracting stimuli as irrelevant information (Moran, 2016). Concentration has been used as a relevant cognitive ability for purposes of optimizing learning in sport (e.g. Moran, 2016) and physical education (PE; e.g. Maldonado et al., 2019). In contrast, distraction was defined as a diversion of attention from some intended targets (Moran, 2016). Distraction

could refer to inward (e.g. daydreams), outward (e.g. scenery), involuntary (e.g. when
environment captures attention), and active distraction (e.g. sending SMS during classroom
activities; Brick et al., 2014).

In the sport context, Moran (2016) suggested that an attentive performer have to continually take relevant cues on the task into account, and ignore numerous distractors to achieve success during motor action. In educational context, Leconte (2005) provided a similar definition underlying the importance of being attentive to relevant information, and to ignore distractors. In PE, Maldonado et al. (2019) defined concentration as the act of focusing on a major event, that would be difficult, because the mind may be easily distracted. The need to identify potential distractors, as non-relevant information and thoughts during a lesson, has also been underlined by Ntoumanis (2005). Content regarding particular movement-relevant cues, the relationships with others (either partners or opponents) and the environment noises are some non-exhaustive examples of relevant and irrelevant cues (Moran, 2016; Wulf & Lewthwaite, 2016).

In regard to the relationship with others, the supervisor (e.g. coach or teacher) could be considered as a source of relevant information for cognitive (Cohen et al., 2003; Leconte, 2005) and motor learning (Wulf & Lewthwaite, 2016), by playing a role in creating and maintaining an appropriate learning space during the task (French, 1997). Supervisor also frequently give tailored and supporting instructions and feedbacks during the task performance, which evolve according to the goal and the understanding of this task (Cohen et al., 2003; Grobe & Pettibone, 1975; Rowe et al., 2014). However, these instructions could also be irrelevant. For example, it has been demonstrated that an inaccuracy in one or two words can lead to a differential effect on learning (Wulf & Lewthwaite, 2016). Instructions could also be perceived as unnecessary, and thus irrelevant, especially when the supervisor

interacts with other sport participants. Supervisor could also provide unclear and stressful
feedbacks/instructions (Rowe et al., 2014), inducing an irrelevant cue hard to process. In
sport, critical or punitive feedback can evoke high level of state anxiety that, in turn,
contributes to a threatening environment and constitutes an irrelevant source of information
for learning (Smith et al., 2007). In PE, it has also been demonstrated that, through what the
teacher says and does, he/she could foster one student's state anxiety (Liukkonen et al., 2010)
and becomes a distractor for the task at hand.

State anxiety could be defined as a situational concept, referring to how the participant feels a situation, in response to possible actual or non-actual threats (Spielberger, 1983). State anxiety could be cognitive (i.e. tension, apprehension) and somatic (i.e. activation of the autonomic nervous system; Spielberger, 1972). Previous research has shown that state anxiety was one of the most important predictor of distractibility (Eysenck et al., 2007) and harmed processing efficiency (Eysenck & Calvo, 1992). State anxiety has also been linked to ruminating about irrelevant things, subsequently distracting athletes (McCarthy et al., 2013). The Attentional Control Theory (Eysenck et al. 2007), based on the Processing Efficiency Theory (Eysenck and Calvo 1992) and validated in the sport anxiety literature (Wilson et al. 2009), postulates that state anxiety interferes with the goal-oriented system of attention and fosters fixation on threatening or irrelevant stimuli in the environment (e.g. Wilson et al. 2009).

94 To our knowledge, measurement of attention and distraction in sport situations has been given
95 little attention. In sport psychology, some psychometric scales measuring attention were
96 interesting (e.g. Test of Attentional and Interpersonal Style, Attentional Focus Questionnaire,
97 Flow State Scale; Nideffer, 1976; Brewer et al., 1996; Fournier et al., 2007), but limited in
98 regard to the definitions of attention, because they used different concepts than

concentration/distraction processes. In PE context, previous studies (Maldonado et al., 2019; Zhang et al., 2012) measured students' concentration using the six items (e.g. "I really concentrate in PE") developed by Standage et al. (2005). In the same vein, Ntoumanis (2005) measured students' concentration using three items (e.g. "In PE, I concentrate on the skills/tasks I have to do"). Although some items of both scales were interesting, none allowed to capture the sport participants' distraction, which has been identified as a major limitation by Ntoumanis (2005). While these studies have reported a suitable internal consistency, both scales were not published nor validated through an extensive validation process. Otherwise, the Cognitive Processes Questionnaire in Physical Education (Solmon & Lee, 1997) assessed cognitive variables intervening in the achievement among elementary and middle schools students. This scale was composed of 33 items divided in five subscales: self-regulation, confidence-efficacy, attention-concentration, willingness to engage, and strategies. Attention-concentration included six items and aimed at assessing the level of concentration by using task-references (e.g. "When I practice, I try to think only about the skill I am working on") and teacher-references (e.g. "I miss important things the PE teacher says because I am not paying attention"). This scale was interesting because it took into account the task and the teacher as relevant cues. However, the role played by the teacher as a potential distractor during the task at hand was not considered. Therefore, while these scales included specific and interesting items about the task and the supervisor, it may not be well suited to the definition of an attentive sport participant, mainly because the supervisor contribution on the distraction process during the task should be considered.

120 Therefore, our aim by developing and validating the Sport Situation Attentional Questionnaire
 121 (SSAQ) was to provide a much-needed measure to comprehensively assess sport participants'
 122 attention. The scale that we tried to develop would allow researchers to better understand the
 123 complex attentional processes involved during a sport situation. Moreover, sport supervisors

could use this type of scale in order to analyse the impact of their pedagogical strategies on sport participants' attention. In that respect, to develop and perform an initial validation of the SSAQ, we have followed the validation steps proposed by Messick (1995) and Boateng et al. (2018). Taking into account the similarities between organized and academic sport practice, in regard to sport situation, such as (1) the implication in cognitive or motor task (e.g. Müller et al., 2018; Wulf & Lewthwaite, 2016), (2) the definition of attention towards the task (e.g. Maldonado et al., 2019; Moran, 2016), (3) the role played by the supervisor (e.g. Camiré, 2015; Wulf & Lewthwaite, 2016), we conducted the present study in high school and college PE classes. Both of these sport environment offered an important application of the constructs outlined in the introduction, and targeted sport participants of all skill levels, and in many and various sport activities. In Study 1, we aimed at developing an initial pool of items. First, we provide a clear definition of what is an attentive student in sport situations, and then we present the process by which we identified and created relevant items and assessed their content validity. In Study 2, we explored the factor structure of the questionnaire, to determine the optimal number of factors that would fit the pool of items, and reduce their numbers. In Study 3, we confirmed the factor structure and its reliability with sports sciences students. Study 3 examined the concurrent validity of the scale with Pearson's correlations between the SSAQ factor dimensions and state anxiety subscales. Measurement invariance across gender groups was also investigated in Study 3. In Study 4, we confirmed the factor structure and its reliability with high school students in PE. **Ethical Requirements** All participants gave informed consent to their participation. According to the declaration of Helsinki and the French current legislation, participants were informed that they could 

 withdraw from the study at any time without any consequences. They were clearly informed

Page 7 of 50

1

2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
1/	
18	
19	
20 21	
∠1 วว	
22	
25 24	
24	
25	
20	
27	
20	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	
5/	
58	
<u> </u>	

that anonymity was retained and that their personal information would remain confidential
and intended only for research purposes. These provisions were applied for all subsequent
studies. Each study has been formally notified to the French National Commission of
Informatics and Liberty (N°2017-261; N°2017-266).

154 Study 1

153

155 Following the steps of scale development and validation (Boateng et al., 2018; Messick, 156 1995), Study 1 aimed to develop a preliminary version of the SSAQ. The first step was to 157 provide a clear definition of attentive sport participant. Secondly, an item generation was 158 conducted, identifying appropriate questions that fitted the previous definition (Boateng et al., 2018). Third, items content validity was examined by the evaluation of a panel of experts, and 159 160 cognitive interviews were conducted (Boateng et al., 2018; Messick, 1995). The panel of 161 experts' evaluation and cognitive interview focused on the discrimination and the reliability 162 of the scale to control the risks of deviation of personal interpretations and decision-making 163 due to unclear items (Cohen et al., 2013).

164

165 Study 1: Domain identification

166 The first step in our scale development was to provide a clear definition of an attentive sport 167 participant, to ensure that the measurement tool adequately captured the concept of attentive 168 sport participant, eliminating extraneous content (Boateng et al., 2018). From existing 169 definitions in the sport (Moran, 2016; Wulf & Lewthwaite, 2016) and PE literature 170 (Maldonado et al., 2019; Ntoumanis, 2005), we identified how an attentive sport participant 171 has been defined, what does imply a good concentration, and which distractors could occur 172 during a sport situation. The first part of the definition of an attentive sport participant was to 173 consider the concentration on the task and the distraction away from the task because a sport 60

participant should adopt an external focus on the relevant informations on the task, and ignore irrelevant informations and distractors (Moran, 2016; Wulf & Lewthwaite, 2016). The second part of the definition of an attentive sport participant was to consider the supervisor as an exogenous cue about the task, which could be relevant when he/she supports the sport participant's cognitive processes (e.g. Wulf & Lewthwaite, 2016), or irrelevant when he/she interferes in the sport participant's cognitive processes (e.g. Liukkonen et al., 2010). In that respect, the definition of an attentive sport participant was the following: a sport participant would be attentive when he/she is able to focus on the relevant cues (e.g. the task, the supervisor's instructions) by not being distracted by irrelevant cues (e.g. distractors linked to the task, distraction linked to the supervisor). From this definition, the research team could not identify a suitable questionnaire to measure concentration and distraction during a sport situation, because distraction, as well as the supervisor contribution on the concentration/distraction process, were not considered. **Study 1: Item Generation** The item generation of the initial version of the SSAQ was established, using the deductive method, through an analysis of existing instruments (Boateng et al., 2018; Clark & Watson,

191 2016), by a panel of four experts. These experts had a previous applied and experimental

192 background in sport practice, PE, cognitive sciences, and psychometric questionnaire

193 development. The item inclusion criteria were: (1) being related to concentration and

194 distraction processes, and (2) being relevant to the context of a sport situation. Some items

195 from the Cognitive Processes Questionnaire in Physical Education (Solmon & Lee, 1997) and

196 the scales developed by Standage et al. (2005) and Ntoumanis (2005) were selected and new

- 197 ones were created, based on the inclusion criteria and the definition of an attentive sport
- <sup>58</sup><sub>59</sub> 198 participant. English items were translated into French by two independent researchers, then

the expert panel compared the two propositions to choose the most relevant item. As
recommended (Boateng et al., 2018), initial item generation have been broader and more
comprehensive than the theoretical view of an attentive sport participant, entailing 50 items at
the end of the process.

204 Study 1: Providing Content Validity Evidence

The 50 items were again submitted to the panel of experts for evaluation to take into account the redundancies, the form and the wording of the items, in order to conserve items simply and unambiguously worded (Boateng et al., 2018). To reach a consensus, the item formulation problems were discussed within the expert panel. In case of disagreement among the panel and after discussion, the item was eliminated. This evaluation had 30 items deleted because they were redundant, tangential or did not perfectly fit the definition of an attentive sport participant during a sport situation (Boateng et al., 2018). Following this process, the pool of items included 20 items (Table 1). After the review process, a content validity assessment was conducted to establish the intelligibility of the questionnaire items, and to identify any potential difficulties in its administration. The approach used a self-reported questionnaire, and was completed by cognitive interviews.

216 Participants and Procedure

Seven and three women sport sciences students ( $M_{age} = 18.60$  years;  $SD_{age} = .70$ ) took part in this study. The first author distributed the surveys and conducted cognitive interviews. It took place after a sport lesson, in a quiet place of the University campus. Each student had to answer each item on a Likert scale of six points ranging from one "absolutely not clear" to six "absolutely clear." The six-point scale was used in order to avoid middle option meaning "cannot say" (Clark & Watson, 2016). The inventory took approximately five minutes to complete.

When the score was not maximal (i.e. below six), cognitive interviews were conducted to
identify the difficulty and to ensure that participants interpreted questions as intended
(Boateng et al., 2018). During the cognitive interview, the participant verbalized the mental
process used to answer (Boateng et al., 2018), then indicated the part of the item that could
not be properly understood. Each cognitive interview took approximately five minutes.

229 Results and Discussion

This study demonstrated an excellent item understanding (M = 5.93; SD = .25; data are described in detail in Supplementary file 1). No item was assessed below 5.50. Among items not achieving the maximal score, the cognitive interviews revealed that participants were not completely sure of the meaning of some terms (e.g. "distracted", "I felt", and "I happened"). After the cognitive interview, the first author concluded systematically that participants interpreted questions as intended, and an agreement on the meaning proposed by the first author was reached. These outcomes attested the clarity and proper understanding of the 20 items by the teenagers (Clark & Watson, 2016). Due to the high scores obtained in regard to the item clarity and understanding, no item modification has been undertaken after this first round of interviews (during which few new insights have emerged; Boateng et al., 2018). The pool of the 20 selected items were validated as such by the panel of experts. Our following studies have tested their psychometric properties.

#### 243 Study 2

This second study aimed at assessing the structural aspect (Messick, 1995) of the SSAQ by exploring its factor structure. This step determined the optimal number of factors that could fit the pool of items, by examining the covariance that existed between all the scale items. This step may also reduce the number of items (Boateng et al., 2018).

248	Study 2: Methods
249	Participants and Procedure
250	The participants consisted in 164 sport sciences students ( $M_{age} = 19.63$ years; $SD_{age} = 2.10$ ),
251	including 43 women and 121 men. The survey was administered during a regular weekly
252	sport practice that took place at the university's sports department. The first author distributed
253	the surveys immediately after a sport situation. The teacher was present but did not interact
254	with the students. The inventory took approximately five minutes to complete. Sports practice
255	included athletics ( $n = 35$ ), baseball ( $n = 27$ ), basketball ( $n = 47$ ), and American football ( $n = 47$ )
256	55).
257	
258	Measures
259	Demographic information. Participants indicated their age, gender (i.e. men, women, or
259 260	<i>Demographic information.</i> Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).
259 260 261	<ul> <li><i>Demographic information.</i> Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).</li> <li><i>SSAQ.</i> Answers were collected on a seven-point Likert scale ranging from one "<i>absolutely</i></li> </ul>
<ul><li>259</li><li>260</li><li>261</li><li>262</li></ul>	<ul> <li><i>Demographic information.</i> Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).</li> <li><i>SSAQ.</i> Answers were collected on a seven-point Likert scale ranging from one "<i>absolutely not agree</i>" to seven "<i>absolutely agree</i>" to increase the usability of the collected data. This</li> </ul>
<ul> <li>259</li> <li>260</li> <li>261</li> <li>262</li> <li>263</li> </ul>	<ul> <li><i>Demographic information.</i> Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).</li> <li><i>SSAQ.</i> Answers were collected on a seven-point Likert scale ranging from one "<i>absolutely not agree</i>" to seven "<i>absolutely agree</i>" to increase the usability of the collected data. This ranging scale seemed the most appropriate (Boateng et al., 2018), as a five-point scale seemed</li> </ul>
<ul> <li>259</li> <li>260</li> <li>261</li> <li>262</li> <li>263</li> <li>264</li> </ul>	<ul> <li>Demographic information. Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).</li> <li>SSAQ. Answers were collected on a seven-point Likert scale ranging from one "absolutely not agree" to seven "absolutely agree" to increase the usability of the collected data. This ranging scale seemed the most appropriate (Boateng et al., 2018), as a five-point scale seemed too restrictive in regard to extreme values (i.e. one and five) and more than seven points on</li> </ul>
<ul> <li>259</li> <li>260</li> <li>261</li> <li>262</li> <li>263</li> <li>264</li> <li>265</li> </ul>	<ul> <li>Demographic information. Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).</li> <li>SSAQ. Answers were collected on a seven-point Likert scale ranging from one "absolutely not agree" to seven "absolutely agree" to increase the usability of the collected data. This ranging scale seemed the most appropriate (Boateng et al., 2018), as a five-point scale seemed too restrictive in regard to extreme values (i.e. one and five) and more than seven points on the scale could lead to problems of interpretation (Cohen et al. 2013).</li> </ul>
<ul> <li>259</li> <li>260</li> <li>261</li> <li>262</li> <li>263</li> <li>264</li> <li>265</li> <li>266</li> </ul>	<ul> <li>Demographic information. Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).</li> <li>SSAQ. Answers were collected on a seven-point Likert scale ranging from one "absolutely not agree" to seven "absolutely agree" to increase the usability of the collected data. This ranging scale seemed the most appropriate (Boateng et al., 2018), as a five-point scale seemed too restrictive in regard to extreme values (i.e. one and five) and more than seven points on the scale could lead to problems of interpretation (Cohen et al. 2013).</li> </ul>
<ul> <li>259</li> <li>260</li> <li>261</li> <li>262</li> <li>263</li> <li>264</li> <li>265</li> <li>266</li> <li>267</li> </ul>	<ul> <li><i>Demographic information.</i> Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice).</li> <li><i>SSAQ.</i> Answers were collected on a seven-point Likert scale ranging from one "absolutely not agree" to seven "absolutely agree" to increase the usability of the collected data. This ranging scale seemed the most appropriate (Boateng et al., 2018), as a five-point scale seemed too restrictive in regard to extreme values (i.e. one and five) and more than seven points on the scale could lead to problems of interpretation (Cohen et al. 2013).</li> <li><i>Data Analysis</i></li> </ul>

269 normality distribution was examined. The factorability of the data was tested using Bartlett's

270 test of sphericity, which should be significant (p < .05; Dziuban & Shirkey, 1974). The

2
3
1
-+ -
5
6
7
Q
0
9
10
11
12
12
13
14
15
16
17
17
18
19
20
21
ר ∠ בר
22
23
24
25
20
20
27
28
29
20
30
31
31 32
31 32 33
31 32 33 34
31 32 33 34
31 32 33 34 35
31 32 33 34 35 36
31 32 33 34 35 36 37
31 32 33 34 35 36 37 38
<ol> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>20</li> </ol>
<ol> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> </ol>
31 32 33 34 35 36 37 38 39 40
<ol> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> </ol>
<ol> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> </ol>
<ol> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> </ol>
<ol> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> </ol>
<ul> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>44</li> </ul>
<ol> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>45</li> </ol>
<ul> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>45</li> <li>46</li> </ul>
<ul> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>45</li> <li>46</li> <li>47</li> </ul>
31 32 33 34 35 36 37 38 39 40 41 42 43 44 5 46 47 48
<ul> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>45</li> <li>46</li> <li>47</li> <li>48</li> </ul>
<ul> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>45</li> <li>46</li> <li>47</li> <li>48</li> <li>49</li> </ul>
<ul> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>45</li> <li>447</li> <li>48</li> <li>49</li> <li>50</li> </ul>
<ul> <li>31</li> <li>32</li> <li>33</li> <li>34</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>40</li> <li>41</li> <li>42</li> <li>43</li> <li>44</li> <li>45</li> <li>46</li> <li>47</li> <li>48</li> <li>49</li> <li>50</li> <li>51</li> </ul>
31         32         33         34         35         36         37         38         940         41         42         43         445         46         47         48         50         51         52
31         32         33         34         35         36         37         38         940         41         42         43         445         46         47         48         50         51         52
31         32         33         34         35         36         37         38         90         41         42         43         445         46         47         48         50         51         52
31         32         33         34         35         36         37         38         90         41         42         43         44         45         46         47         48         50         51         52         53
31 32 33 34 35 36 37 38 9 40 41 42 43 44 50 51 52 53 55 55
31 32 33 34 35 36 37 38 9 40 41 42 34 45 46 7 8 9 0 1 2 5 3 45 55 55 55 55
31         32         33         34         35         36         37         38         90         41         42         43         44         45         46         47         48         49         51         52         53         54         55         56
31 32 33 34 35 36 37 38 9 40 41 42 43 44 50 51 52 53 55 55 57
31 32 33 34 35 36 37 38 9 40 41 42 43 44 50 51 52 53 55 55 55 57 58

1

271 sampling adequacy was tested using the Kaiser-Meyer-Olkin's test (KMO), which should be 272 higher than .80 (Dziuban & Shirkey, 1974). Based on the theoretical definition of an attentive 273 sport participant, we had an a priori understanding of the number of factors to retain, 274 expecting two (e.g. concentration/distraction) or four-factor (e.g. concentration related to the 275 task, concentration related to the teacher, distraction related to the task, distraction related to 276 the teacher). However, the extraction method used in SPSS software had not previously 277 specified the number of factor to retain. Scree plot inspection method (Cattell, 1966) 278 conjointly with Minimum Average Partial method (MAP; Velicer, 1976) were used to decide 279 how many factors to retain (Costello & Osborne, 2005; Izquierdo et al., 2014). Exploratory 280 Factor Analysis (EFA) with maximum likelihood factors extraction were conducted (Gaskin 281 & Happell, 2014). Oblimin rotation was chosen because of the likelihood that the factors 282 might be correlated. The following indicators were used and their satisfactory cut points are 283 mentioned in brackets: factor loading (> .40; Costello & Osborne, 2005), no salient cross-284 loading (i.e. item loading at .32 or higher on two or more factors; Costello & Osborne, 2005) 285 and total variance explained (> 50%; Tinsley & Tinsley, 1987). Internal consistency of factor 286 dimensions was evaluated with Cronbach's alpha ( $\alpha > .80 =$  excellent,  $.80 > \alpha > .70 =$ satisfactory,  $.70 > \alpha > .60 =$  lower limits; Hair et al., 2010) and inter-correlations were 287 288 inspected. 289

#### 290 Study 2: Results and discussion

291 Preliminary Analysis

Ten items presented missing data without exceeding 2.4%. Therefore, a list-wise deletion was
applied (Garson, 2015). A scoring distribution analysis showed that univariate normality
(scoring distribution of each item are available in Supplementary file 2) was not achieved for
eight items (skewness range: -4.37 to 12.14; kurtosis range: -3.48 to 14.36). Despite the fact

that the assumption of normality was not met, the EFA with maximum likelihood method was fairly robust, justifying its use (Gaskin & Happell, 2014).

#### Exploratory factor analysis of the 20-SSAO

The sampling was adequate (KMO = .86). Bartlett's test showed no problem of sphericity ( $\chi^2$ (190) = 1426.55, p < .01). An examination of the scree plot of the initial eigenvalues and the MAP method indicated that a four-factor structure should be retained. The percentage of total variance explained by the extracted four factors was 63.43%. EFA with maximum likelihood method and Oblimin rotation was generated with a four-factor structure (Table 1). The items were clustered into the following four categories, which the previously mentioned expert panel had labeled as: (I) concentration on the task, (II) concentration due to the teacher, (III) distraction away from the task, and (IV) distraction toward the teacher. No cross loading was observed and items loaded highly, excepted item 3 (i.e. "I made mistakes of inattention") and item 20 (i.e. "I directed more my attention to the teacher than to the exercise"). Item 3 loaded below the cut point of .40 on the category labelled distraction away from the task and item 20 loaded weakly on the category labelled concentration due to the teacher, whereas the expert panel formulated item 20 in reference to the distraction toward the teacher (Table 1). Internal consistency of each factor dimensions was satisfactory, and inter-item correlations within factor dimensions varied between .44 and .68 for the factor I ( $\alpha = .88$ ), between .52 and .64 for the factor II ( $\alpha = .87$ ). The factor III ( $\alpha = .75$ ) showed inter-item correlations between .42 and .57, except item 3 (between .04 and .32). The factor IV ( $\alpha = .75$ ) showed inter-item correlations between .39 and .53, except item 20 (between .18 and .35). Considering the weak factor loading of item 3 and item 20 and their low inter-correlations, a second analysis was conducted without them (Little et al., 1999). 

Page 14 of 50

#### Exploratory factor analysis of the 18-SSAQ

The sampling was adequate (KMO = .87). Bartlett's test showed no problem of sphericity ( $\gamma^2$ (153) = 1369.28, p < .01). Examination of the scree plot of the initial eigenvalues and the MAP method again indicated that a four-factor structure should be retained. The total percentage of variance explained by extracted four factors was improved to 67.49%. EFA with maximum likelihood method and Oblimin rotation was generated with a four-factor structure. The items were clustered into the same four categories as labelled above. No cross loading was observed and all item loaded highly on its intended factor (Table 1). Internal consistency improved for the factor dimensions III ( $\alpha = .77$ ) and IV ( $\alpha = .79$ ), as well as their inter-item correlations (between .39 and .53 for the factor dimension III and between .42 and .57 for the factor dimension IV). To summarize, EFA on the 18-SSAQ version was more adequate, showing better sampling adequacy, better four-factor structure with all items loading highly on only one factor, and higher total explained variance. Reliability analysis showed better internal consistency and inter-correlations. Each factor entailed the minimum of four items, which is a key aspect in scale development because it ensures an adequate internal consistency reliability (Clark & Watson, 2016). Consequently, the version with 18 items entailing four factors has been retained: concentration on the task (CTASK), concentration due to the teacher (CTEACHER), distraction away from the task (DISTASK), and distraction toward the teacher (DISTEACHER). These four factors were in line with the definition of an attentive sport participant. The factors concentration on the task and concentration due to the teacher referred to "focus on the relevant cues (e.g. the task, the supervisor's instructions)." The factors distraction away from the task and distraction toward the teacher referred to "being not distracted by irrelevant cues (e.g. distractors linked to the task, distraction linked to the *supervisor*)." 

#### 346 [Table 1 near here]

Study 3

The third study aimed at assessing the structural aspect and the external aspect of the SSAQ validity (Messick, 1995) with sport sciences students, confirming the factor structure of the SSAQ and testing the concurrent validity of the scale on state anxiety. The second goal of this study was to assess the generalizability aspect of the SSAQ validity (Messick, 1995). Therefore, social desirability was controlled because of the human tendency to present oneself in the best possible way could significantly distort the information obtained through self-assessments (Van de Mortel, 2008). Finally, measurement invariance was examined to determine if the four-factor structure of the SSAQ was the same across gender groups. Then, differences in score according to the gender were examined, because this consideration is commonplace in the sport group dynamics literature, frequently identifying gender as moderation variable (Benson & Eys, 2017), and because gender differences has been shown to influence cognitive ability (Alavi et al., 2019). Differences in score according to the sport experience were also examined because attentional behaviors could differ between an expert practicing with more automatic attention and a novice practicing with more controlled attention (Abernethy et al., 2007).

364 Study 3: Methods

#### *Participants and Procedure*

As the data collection in Study 2 and Study 3 were on different campuses or sports premises, no participants had the opportunity to take part in both data collections. In Study 3, the participants were 216 sports sciences students ( $M_{age} = 18.91$  years;  $SD_{age} = 1.30$ ), including 96 women and 120 men. The first author distributed the surveys immediately after a sport situation during a regular weekly sport practice at the university's sports department. The teacher was present but did not interact with the students. The inventory took approximately ten minutes to complete. Sports practices were swimming (n = 19), floor gymnastics (n = 15), French boxing (n = 28), volleyball (n = 109), badminton (n = 20), and tennis (n = 25). Measures **Demographic information.** Participants indicated their age, gender (i.e. men, women, or other), and sports experience (i.e. no practice, and regular practice). SSAQ. Answers to 18 items were on a Likert scale of seven points ranging from one "absolutely not agree" to seven "absolutely agree." State anxiety. The French version of the Competitive State Anxiety Inventory-2 (CSAI-2; Cury et al., 1999) is a global measure of state anxiety adapted to sport competition and includes three subscales: self-confidence (nine items; e.g. "I was confident."), cognitive state anxiety (seven items; e.g. "I was afraid of failing."), and somatic state anxiety (seven items; e.g. "I felt my stomach tighten."). Answers were on a Likert scale of four points ranging from one "not at all" to four "much." This French version of the CSAI-2 has been validated in a sport context with middle school and high school students, sport science students and elite athletes (Cury et al., 1999). This scale has been previously used by Arous et al. (2013) with a population of 320 practitioners of individual and team sports ( $M_{age} = 19.37$  years;  $SD_{age} =$ 1.26), including 160 women and 160 men. This study reported satisfactory internal consistency for self-confidence ( $\alpha = .93$ ), cognitive state anxiety ( $\alpha = .89$ ), and somatic state anxiety ( $\alpha = .82$ ). In a PE context, this scale has been used by Isoard-Gautheur et al. (2010) with 461 middle school and high school students ( $M_{age} = 15.68$ ;  $SD_{age} = 1.17$ ), including 213

women and 248 men. Isoard-Gautheur et al. (2010) reported satisfactory internal consistency for self-confidence ( $\alpha = .79$ ), cognitive state anxiety ( $\alpha = .79$ ), and somatic state anxiety ( $\alpha = .74$ ).

Social desirability. The Marlowe-Crowne Social Desirability scale form C (Reynolds, 1982) evaluates social desirability with 13 items. Participants rated "*true*" or "*false*" to answers concerning their personal attitudes (e.g. "*I am always courteous, even to people who are disagreeable*"). The present study used a French adaptation, which have been administered by Verardi et al. (2010) with 697 participants ( $M_{age} = 32.14$ ;  $SD_{age} = 13.76$ ), including 370 women and 327 men. The authors reported a satisfactory internal consistency ( $\alpha = .63$ ).

403 Data Analysis

Data analysis were performed using SPSS Amos 22. Missing values were inspected and univariate normality distribution was tested. A confirmatory factor analysis (CFA) with maximum likelihood robust estimator was applied on the SSAQ to confirm the structure of the scale. A CFA were also conducted with the CSAI-2 and the social desirability scale. Following adjustments indices were used and their satisfactory cut-off points are mentioned in brackets (Hu & Bentler, 1999): the chi-square fit index ( $\chi^2$ ), Comparative Fit Index and Tucker-Lewis Index (CFI and TLI > .90 were satisfactory and > .95 were excellent), Root Mean Square Error of Approximation (RMSEA < .08 indicated adequate model, < .06 excellent fit), and RMSEA 90% confidence intervals. To test the measurement model's reliability, the composite reliability (CR > .70; Hair et al., 2016) was examined in addition to the internal consistency using Cronbach's alpha. To complete the structure analysis, convergent validity was assessed using the Average Variance Extracted (AVE > .5) and divergent validity was assessed using the Average Shared Variance (ASV < AVE; Hair et al., 

2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
10	
17	
10	
יבי 20	
20	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39 10	
40 1	
42	
43	
44	
45	
46	
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	
57	
58	
59	

417 2016). External aspect of the SSAQ validity was inspected, testing the concurrent validity of 418 the scale with Pearson's correlations between the SSAQ factor dimensions and the CSAI 419 subscales (coefficients r ranging between .10 - .30 = small effect, .30 - .50 = medium effect, 420 and  $\geq .50 =$  large effect; Cohen, 2013). To test the bias of social desirability, Person's 421 correlations and a one-way ANOVAs were conducted. To determine if the four-factor 422 structure of the SSAO was the same across gender groups (i.e. women and men), configural 423 invariance (i.e. same factor structure across groups), metric invariance (i.e. same factor 424 loadings across groups), and scalar invariance (i.e. same item intercepts across groups) were 425 examined, using multiple groups CFA. Metric invariance was tested once configural 426 invariance was established, and scalar invariance was tested once metric invariance was 427 established. We compared models by examining  $\chi^2$ , CFI, TLI, and RMSEA differences. There 428 was no invariance when changes in CFI and TLI were < .01 and increases in RMSEA were < 429 .015 (Chen, 2007). Strong measurement invariance was demonstrated when all three tests 430 showed invariance. Then, to examine the scale sensitivity to gender and sport experience, 431 one-way ANOVAs were conducted. For all statistical tests, the significance level was set at p 432 < .05. 433

434 Study 3: Results and discussion

435 Preliminary analysis

47 436 Between 0% and 1.9% of missing data per variable were observed. Since the missing data 49 437 were considered as missing completely at random (MCAR; p > .05; Little, 1988), data were 438 estimated using full information Maximum Likelihood estimation (ML; Garson, 2015). 439 Scoring distribution analysis showed that univariate normality (scoring distribution of each 440 item are available in Supplementary file 2) was not achieved for nine items (skewness range: -54 7.18 to 16.07; kurtosis range: -4.18 to 23.56). CFA with the social desirability scale supported

2
3
4
5
5
0
/
8
9
10
11
12
13
14
15
16
17
18
19
20
20 21
∠ I ጋ ጋ
22
∠3 24
24
25
26
27
28
29
30
31
32
33
34
35
36
37
20
20
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
50
54
55
50
5/
58
59
60

442	adequate model fit (Supplementary file 3). CFA with CSAI-2 indicated that the item 4 (i.e. "I
443	am agitated") loaded negatively in its intended factor (i.e. somatic state anxiety). We
444	therefore applied a CFA with the CSAI-2 excluding item 4, which presented an acceptable
445	model fit (Supplementary file 3). Item 4 was excluded from the following analysis. The
446	Cronbach's alpha of CSAI-2 subscales and social desirability scale were satisfactory (ranging
447	from .64 to .91; Table 3).
448	
449	Confirmation of the Factor Structure
450	The model fit was adequate ( $\chi^2 = 297.6$ , df = 129, $p < .001$ , TLI = .90, CFI = .91, RMSEA =
451	.08, LO $90\% = .07$ , HI $90\% = .09$ ) and the standardized factor loadings were between .55 and
452	.89 (model data are described in detail in Supplementary file 4). Modification indices (MI)
453	indicated the model fit could be improved, if the error covariance between two items from the
454	concentration due to the teacher (i.e. item 6 "I felt that the teacher was helping me to be
455	concentrated on the exercise", and 18 "I felt that the teacher was helping me focus better")
456	was free to co-vary (MI = $22.27$ ). Because these items were theoretically close, the final
457	model included these specifications. The new model (Figure 1) showed a better fit to the data:
458	$\chi^2 = 255.89$ , df = 128, $p < .001$ , TLI = .92, CFI = .93, RMSEA = .07, LO 90% = .06, HI 90%
459	= .08. The standardized factor loadings were between .55 and .89.
460	
461	[Figure 1 near here]
462	
463	Validity, Reliability, Outcomes Correlations, Measurement Invariance and Sensitivity
464	Cronbach's alphas, factor correlations, CR, AVE, ASV, means and standard deviations are

465 presented in Table 2. AVE were above .05 and ASV below their respective AVE, meeting the

466 requirements for convergent validity and divergent validity. All factor dimensions presented a

satisfactory reliability with all CR above .70. Correlations between each factor dimensions
were almost all significant. Concentration factor dimensions had significant and negative
relationships with distraction away from the task. Concentration factor dimensions were
positively related to each other as well as distraction factor dimensions. All Cronbach's alpha
were above .70, meeting the requirements for internal consistency.

#### 473 [Table 2 near here]

Correlations with the CSAI-2 confirmed the concurrent validity of the SSAQ (Table 3). Low positive correlations between distraction away from the task and somatic state anxiety, and between distraction toward the teacher and cognitive state anxiety and somatic state anxiety were found. Low negative correlations between distraction away from the task and self-confidence were also observed. These results were in line with previous studies showing that state anxiety was related to distractibility, but especially when stimuli was threat related (Eysenck et al., 2007). This could explain why the correlations with the distraction factor dimensions were low, because the teacher was considered as a factor of state anxiety, but probably not as a threat. Usually, state anxiety is related to distraction (Eysenck & Wilson, 2016; Grossbard et al., 2009), and interacts less with the willingness of focusing on the task or the teacher. Another explanation of the weak correlations with SSAQ factors could be related to the calculation of Pearson's correlations, relying on the covariance of two variables divided by the product of their standard deviation (Bishara & Hittner, 2015). The high skewness and high kurtosis, due to floor and ceiling effects (Supplementary file 2), could have limited the correlation effect (Bishara & Hittner, 2015). [Table 3 near here]

492	
493	Concerning the measurement invariance models of the SSAQ, the $\Delta \chi^2$ ( $\Delta df$ ) was not
494	significant for both models. CFI, TLI and RMSEA changes were < .01 (Table 4). We have
495	concluded that factor structure, factor loadings, and item intercepts remained invariant across
496	gender. Then, SSAQ sensibility was tested using one-way ANOVAs. Levene statistic
497	indicated that assumption of variance homogeneity was not violated ( $p > .05$ ). Results
498	showed a significant difference on concentration due to the teacher ( $F(1,215) = 5.57$ , $\eta^2 = .03$ ,
499	p = .02), with women ( $n = 96$ ; $M = 5.08$ ; $SD = 1.33$ ) more concentrated due to the teacher
500	than men ( $n = 120$ ; $M = 4.62$ ; $SD = 1.49$ ). Similar results were found among elementary
501	students, showing that girls demonstrated higher level of attention than boys (Alavi et al.,
502	2019; Grossbard et al., 2009). In addition, women may have been more concentrated because
503	they tend to be more learning goal oriented (Anderman & Young, 1994), whereas men tend to
504	be less self-disciplined (Zimmerman & Martinez-Pons, 1990). Therefore, future research
505	using the SSAQ should consider the influence of gender.
506	
507	[Table 4 near here]
508	

Concerning the influence of social desirability, one-way ANOVAs were conducted based on the median value which separated the sample into two groups. Students with a score of social desirability under seven (median value) were included in the fewest desirable ones' group. Inversely, students with a score of social desirability above seven were included in the most desirables ones' group. Levene statistic indicated that assumption of variance homogeneity was not violated (p > .05). A significant difference was found on distraction away from the task (F(1,215) = 6.84,  $\eta^2 = .03$ , p = .01), with the most desirable ones (n = 104; M = 2.95; SD = 1.48) having a lower distraction scores than the fewest desirable ones (n = 112; M = 3.51; 

SD = 1.64). Results also showed low negative correlations with distraction away from the task and distraction toward the teacher. Students' distraction would be related to social desirability because students' indicators such as attention, interest and task execution have been considered as relevant for teachers (Durand, 1996) yielding items as socially sensitive (Van de Mortel, 2008). Students with high social desirability may have modified their answer in order to appear less distracted and therefore to build a good reputation with their teacher. Although this bias could be low, some precautions should be taken. During the instructions given to sport participants, investigators should emphasize that the data will be collected and held anonymously (Randall & Fernandes, 1991). Participants could fill out a social desirability scale allowing to control the characteristics of the study sample. It may be envisaged as well that the supervisor will be absent when the sport participants answer the questionnaire. Finally, one-way ANOVAs were conducted with sport experience outside school as a group variable. Two groups were distinguished: no practice (n = 40) and regular practice (n = 176). Levene statistic indicated that assumption of variance homogeneity was not violated (p > p.05). There was no significant difference between the two groups (p > .05). Despite this result, future studies should consider the influence of sport experience because the sample was small and subsequent studies may find differences. Study 4 This fourth study aimed at confirming the factor structure of the SSAQ and assessing its reliability with high school students in a PE context. This study completed the assessment of the structural aspect of the SSAQ (Messick, 1995), examining its validity in another relevant

- <sup>57</sup> 540 context.

1 2		
3 4	541	
5 6 7	542	Study 4: Methods
, 8 9	543	Participants and Procedure
10 11 12	544	The participants consisted in 481 high school students ( $M_{age} = 15.40$ years; $SD_{age} = .87$ ),
13 14	545	including 317 girls and 161 boys (3 did not specify their gender), from 23 different high
15 16	546	schools. A single class from each school took part in the study, based on the PE teachers'
17 18 19	547	approval. The first author distributed the surveys immediately after a sport situation (after a
20 21	548	warm-up) during a regular PE lesson. The teacher was present but did not interact with the
22 23	549	students. Participants answered the SSAQ on a Likert scale of seven points ranging from one
24 25 26	550	"absolutely not agree" to seven "absolutely agree." The inventory took approximately five
26 27 28	551	minutes to complete. Sports practices were athletics ( $n = 33$ ), climbing ( $n = 23$ ), rugby ( $n =$
29 30	552	21), volleyball ( $n = 27$ ), basketball ( $n = 55$ ), team handball ( $n = 30$ ), table tennis ( $n = 15$ ),
31 32	553	artistic gymnastics ( $n = 54$ ), badminton ( $n = 64$ ), step ( $n = 46$ ), and strength training ( $n = 64$ )
33 34 35	554	113).
36 37	555	
38 39	556	Data Analysis
40 41 42	557	Data analysis were conducted using the statistics software SPSS Amos 22. Missing values
43 44	558	were examined and univariate normality distribution was analyzed. A CFA with maximum
45 46 47	559	likelihood robust estimator was applied on the SSAQ to confirm the structure of the scale,
47 48 49	560	using the same criteria described in Study 3. The measurement model's reliability was tested
50 51	561	by examining the composite reliability, the internal consistency of each factor dimension, the
52 53	562	convergent validity, and the divergent validity, with the same criteria described in Study 3.
54 55 56	563	
57 58		
59 60		

#### 564 Study 4: Results and discussion

#### 565 Preliminary analysis

Between 0% and 1.9% of missing data per variable were observed. Since the missing data were considered as MCAR (p > .05; Little, 1988), data were estimated using full information ML estimation (Garson, 2015). Scoring distribution analysis showed that univariate normality (scoring distribution of each item are available in Supplementary file 2) was not achieved for 14 items (skewness range: -10.39 to 19.75; kurtosis range: -6.44 to 18.14).

572 Confirmation of the Factor Structure

The model fit was adequate ( $\chi^2 = 321.55$ , df = 129, p < .001, TLI = .94, CFI = .95, RMSEA = .06, LO 90% = .05, HI 90% = .06) and the standardized factor loadings were between .44 and .82 (model data are described in detail in Supplementary file 4) in a sport situation. As was the case in the CFA of Study 3, MI indicated the model fit could be improved if the error covariance between two items from the concentration due to the teacher (i.e. item 6 "I felt that the teacher was helping me to be concentrated on the exercise", and 18 "I felt that the *teacher was helping me focus better*") was free to co-vary (MI = 22.34). Because these items were theoretically close and in line with the CFA of Study 3, these specifications were accepted. The new model (Figure 2) showed a better fit to the data:  $\chi^2 = 285.38$ , df =128, p < .001, TLI = .95, CFI = .96, RMSEA = .05, LO 90% = .04, HI 90% = .06). The standardized factor loadings were between .44 and .83. [Figure 2 near here] 

,	
2 3 4	
5 6 7	
7 8 9	
10 11	
12 13	
14 15	
16 17	
18 19 20	
20 21 22	
23 24	4
25 26	
27 28	
29 30 31	•
32 33	•
34 35	(
36 37	(
38 39	(
40 41 42	(
43 44	(
45 46	(
47 48	(
49 50	(
52 53	(
54 55	(
56 57	(
58 59	(

60

587	Validity and Reliability
588	Cronbach's alphas, factor correlations, CR, AVE, ASV, means and standard deviations are
589	presented in Table 5. AVE were above .05 and ASV below their respective AVE, meeting the
590	requirements for convergent validity and divergent validity. All factor dimensions presented a
591	satisfactory reliability with all CR above .70. All factor correlations were significant.
592	Concentration factor dimensions showed significant and negative relationships with
593	distraction factor dimensions. Concentration factor dimensions were positively related to each
594	other as well as distraction factor dimensions. All Cronbach's alpha scored above .70, and
595	showed a correct internal consistency.
596	
597	[Table 5 near here]
598	
500	Conoral Discussion
577	General Discussion
600	The purpose of the present work was to develop a self-reported measurement of sport
600 601	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of
600 601 602	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize
<ul> <li>600</li> <li>601</li> <li>602</li> <li>603</li> </ul>	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize sport participants' concentration and reduce distraction. We then developed a self-reported
<ul> <li>600</li> <li>601</li> <li>602</li> <li>603</li> <li>604</li> </ul>	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize sport participants' concentration and reduce distraction. We then developed a self-reported measurement to capture the sport participants' level of concentration/ distraction.
<ul> <li>600</li> <li>601</li> <li>602</li> <li>603</li> <li>604</li> <li>605</li> </ul>	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize sport participants' concentration and reduce distraction. We then developed a self-reported measurement to capture the sport participants' level of concentration/ distraction. Four separate studies provided evidence for the construct validity of the SSAQ. Study
<ul> <li>600</li> <li>601</li> <li>602</li> <li>603</li> <li>604</li> <li>605</li> <li>606</li> </ul>	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize sport participants' concentration and reduce distraction. We then developed a self-reported measurement to capture the sport participants' level of concentration/ distraction. Four separate studies provided evidence for the construct validity of the SSAQ. Study 1 provided a definition of attentive sport participant, and developed 50 items. Based on the
<ul> <li>600</li> <li>601</li> <li>602</li> <li>603</li> <li>604</li> <li>605</li> <li>606</li> <li>607</li> </ul>	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize sport participants' concentration and reduce distraction. We then developed a self-reported measurement to capture the sport participants' level of concentration/ distraction. Four separate studies provided evidence for the construct validity of the SSAQ. Study 1 provided a definition of attentive sport participant, and developed 50 items. Based on the definition, the panel of experts' evaluations refined the initial pool of items to 20 items.
<ul> <li>600</li> <li>601</li> <li>602</li> <li>603</li> <li>604</li> <li>605</li> <li>606</li> <li>607</li> <li>608</li> </ul>	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize sport participants' concentration and reduce distraction. We then developed a self-reported measurement to capture the sport participants' level of concentration/ distraction. Four separate studies provided evidence for the construct validity of the SSAQ. Study 1 provided a definition of attentive sport participant, and developed 50 items. Based on the definition, the panel of experts' evaluations refined the initial pool of items to 20 items. Cognitive interviews with sport sciences students ensured the content validity of this initial
<ul> <li>600</li> <li>601</li> <li>602</li> <li>603</li> <li>604</li> <li>605</li> <li>606</li> <li>607</li> <li>608</li> <li>609</li> </ul>	The purpose of the present work was to develop a self-reported measurement of sport participants' concentration/distraction. In the current set of studies, we offered a definition of an attentive sport participant, which could be useful to better understand how to maximize sport participants' concentration and reduce distraction. We then developed a self-reported measurement to capture the sport participants' level of concentration/ distraction. Four separate studies provided evidence for the construct validity of the SSAQ. Study 1 provided a definition of attentive sport participant, and developed 50 items. Based on the definition, the panel of experts' evaluations refined the initial pool of items to 20 items. Cognitive interviews with sport sciences students ensured the content validity of this initial pool of 20 items. Study 2 provided evidence for the four-factor structure of the SSAQ

611 from the task, and distraction toward the teacher). Refining the scale to 18 items, by

1	
2 3 4	6
5 6	6
7 8 0	6
9 10 11	6
12 13	6
14 15 16	6
17 18	6
19 20	6
21 22 23	6
24 25	6
26 27	6
28 29 30	6
30 31 32	6
33 34	6
35 36 27	6
37 38 39	6
40 41	6
42 43	6
44 45 46	6
47 48	6
49 50	6
51 52	6
55 55	6
56 57	6
58 59	6
60	

612	considering factor loading in EFA and inter-correlations, the SSAQ respected the minimum of
613	four items for each factor (Clark & Watson, 2016). Study 3 provided evidence for the factor,
614	convergent and divergent validity of the subscales, and found support for measurement
615	invariance according to the gender. Study 3 also supported concurrent validity, as state
616	anxiety was correlated with the distraction subscales. Study 4 demonstrated a consistently
617	good factor structure of the SSAQ across a sample of high school students during a PE sport
618	situation. Finally, studies 2, 3 and 4 demonstrated satisfactory internal consistency reliability
619	of the SSAQ.
620	A noteworthy feature of the SSAQ is its adaptability to several sport situations context. This
621	adaptability results from the wordings of the items that are easily tailored to academic or
622	organized sport situation (e.g. using "coach" instead of "teacher"; Riou et al., 2012). As a
623	result, the SSAQ is a somewhat short instrument (18 items) that can be easily used to measure
624	sport participants' concentration and distraction during different sport situations, such as PE
625	course, sport lesson in higher education, sport training in club and sport programs for health
626	and well-being (Riou et al., 2012).
627	Another important strength of the SSAQ is that this questionnaire considers the
628	concentration/distraction with the task and the supervisor, as an aspect which has never been
629	considered before, when capturing sport participants' concentration with self-reported
630	measures (Maldonado et al., 2019; Ntoumanis, 2005; Solmon & Lee, 1997; Standage et al.,
631	2005; Zhang et al., 2012). From a theoretical standpoint, the SSAQ will allow researchers to
632	test various theories and pedagogical practices that can improve sport participants'
633	concentration and reduce sport participants' distraction. For example, using self-
634	determination theory (Ryan & Deci, 2017), the following sequence could be investigated:
635	motivational climate - basic psychological need satisfaction/frustration - self-determined
636	motivation – concentration/distraction. Similar causal sequences have been previously tested

1	
2	
3 1	
5	
6	(
7	
8	
9 10	
11	
12	(
13 14	
15	(
16	
17	(
18	
20	(
21	
22	
23 24	
25	
26	(
27	
20 29	(
30	
31	(
32	
33 34	0
35	
36	
37	
39	
40	(
41	
42 43	
44	
45	0
46	
47 48	
49	
50	
51	(
52 53	
54	(
55	
56	(
57 58	
59	(
60	

637	with concentration (Maldonado et al., 2019; Ntoumanis, 2005; Standage et al., 2005).
638	However, none of these authors have considered sport participants' distraction. Besides, few
639	studies have focused on how self-determined behaviours influence cognitive variables
640	(Vasconcellos et al., 2020). The SSAQ and self-determination theory combined offer
641	possibilities to begin inspecting the effects of motivational climate in sport participants'
642	concentration/distraction. By developing and validating the SSAQ as well, we have attempted
643	to fill a theoretical gap and a lack of psychometric scale in sport situations.
644	However, although all studies in this paper provided evidence for the validity and reliability
645	of the SSAQ, our work also have some limitations. Items asymmetry and kurtosis are high in
646	all of the studies. The factor dimension distraction toward the teacher also presented high
647	skewness and kurtosis in all the studies. In accordance with these results (Terwee et al.,
648	2007), the response frequencies for each item in each study (presented in Supplementary file
649	2), have underlined floor and ceiling effects (i.e. when more than 15% of participants
650	achieved the lowest or highest possible score; Terwee et al., 2007). This result could be
651	explained because the supervisor did not adopted distracting behaviors. It would be
652	interesting to examine the concurrent validity of the SSAQ during anxiety-inducing situations
653	in sport, fostering sport participant's state anxiety that may increase distraction (Eysenck &
654	Wilson, 2016) and may disrupt concentration (Smith et al., 2006). In the same vein,
655	concurrent validity should be also tested with other variables such as reaction time or other
656	psychological variables, in order to improve evidence of the SSAQ validity. Furthermore,
657	although validity and reliability of the SSAQ were also investigated among high school
658	students ( $M_{age} = 15.40$ years; $SD_{age} = .87$ ), the content validity of the SSAQ was established
659	with university students aged around 18 to 19 years. The SSAQ questionnaire interpretation
660	may be different across age groups. Future research should run invariance analysis to examine
661	the role of age gap in the measurements of these four factor dimensions. Another limitation of

2 3 4	662	the present research is that the SSAQ relies on students' perceptions of whether they felt
5 6	663	concentrated and distracted during the sport situation. With any self-reported measure, there
7 8	664	are always concerns with memory recall, social desirability and the truthfulness of responses
9 10 11	665	(Brenner & DeLamater, 2014). For example, Study 3 found that the distraction factor
12 13	666	dimensions were slightly affected by the social desirability response bias.
14 15	667	In conclusion, the present studies provided evidence for the validity and reliability of
16 17 18	668	the SSAQ. The SSAQ could be used to conduct research with individuals during a sport
19 20	669	situation implying a supervisor, aiming at assessing the predictors and consequences of sport
21 22	670	participants' concentration and distraction on various variables such as emotion, motivation,
23 24	671	learning, and performance. The SSAQ fosters initiatives such as exploring the role of
25 26 27	672	pedagogical strategies during sport situations on sport participants' concentration and
28 29	673	distraction. The SSAQ could also be used by supervisors to evaluate the level of
30 31	674	concentration and distraction of individuals during a sport situation.
32 33 34	675	
35 36	676	Disclosure statement
37 38	677	The authors declared no potential conflicts of interest or financial benefits. This research did
39 40	678	not receive any specific grant.
41 42	679	
43 44 45	680	References
45 46	681	Abernethy, B., Maxwell, J. P., Masters, R. S. W., Van der Kamp, J., & Jackson, R. C. (2007).
47 48	682	Attention processes in skill learning and expert performance. In G Tenenbaum & R
49 50	683	C Eklund (Éds.) Handbook of Sport Psychology 3rd Ed Wiley
51	684	Alavi, M., Seng, J. H., Mustaffa, M. S., Ninggal, M. T., Amini, M., & Latif, A. A. (2019).
52 53	685	Attention impulsiveness and gender in academic achievement among typically
54 55	686	developing children <i>Percentual and Motor Skills</i> 126(1) 5-24
56	687	https://doi.org/10.1177/0031512518800163
57 58	00/	nups.//uol.org/10.11///0051512516007105
59 60		

1

Page 29 of 50

1 2		
3	688	Anderman, E. M., & Young, A. J. (1994). Motivation and strategy use in science : Individual
5	689	differences and classroom effects. Journal of Research in Science Teaching, 31(8),
6 7	690	811-831. https://doi.org/10.1002/tea.3660310805
8 9	691	Arous, I., Baccouche, M. A., Trabelsi, K., Masmoudi, L., & Elloumi, A. (2013). Effect of
10	692	gender and type of sport on anxiety and self-esteem. International Journal of
12	693	Humanities and Social Science Invention, 2(3), 55-61.
13 14	694	Benson, A. J., & Eys, M. (2017). Understanding the consequences of newcomer integration
15 16	695	processes : The sport team socialization tactics questionnaire. Journal of Sport and
17	696	Exercise Psychology, 39(1), 13-28. https://doi.org/10.1123/jsep.2016-0182
18 19	697	Bishara, A. J., & Hittner, J. B. (2015). Reducing Bias and Error in the Correlation Coefficient
20 21	698	Due to Nonnormality. Educational and Psychological Measurement, 75(5), 785-804.
22 23	699	https://doi.org/10.1177/0013164414557639
23	700	Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L.
25 26	701	(2018). Best practices for developing and validating scales for health, social, and
27 28	702	behavioral research : A primer. Frontiers in Public Health, 6, 149.
29	703	https://doi.org/10.3389/fpubh.2018.00149
30 31	704	Brenner, P., & DeLamater, J. (2014). Social desirability bias in self-reports of physical
32 33	705	activity : Is an exercise identity the culprit? Social Indicators Research: An
34 35	706	International and Interdisciplinary Journal for Quality-of-Life Measurement, 117(2),
36	707	489-504. https://doi.org/10.1007/s11205-013-0359-y
37 38	708	Brewer, B. W., Van Raalte, J. L., & Linder, D. E. (1996). Attentional focus and endurance
39 40	709	performance. Applied Research in Coaching and Athletics Annual, 11, 1-14.
41 42	710	Brick, N., MacIntyre, T., & Campbell, M. (2014). Attentional focus in endurance activity :
43	711	New paradigms and future directions. International Review of Sport and Exercise
44 45	712	Psychology, 7(1), 106-134. https://doi.org/10.1080/1750984X.2014.885554
46 47	713	Calmels, C., Berthoumieux, C., & d'Arripe-Longueville, F. F. (2004). Effects of an imagery
48 40	714	training program on selective attention of national softball players. The Sport
49 50	715	Psychologist, 18(3), 272-296. https://doi.org/10.1123/tsp.18.3.272
51 52	716	Camiré, M. (2015). Examining High School Teacher-Coaches' Perspective on Relationship
53 54	717	Building With Student-Athletes. International Sport Coaching Journal, 2(2), 125-136.
54 55	718	https://doi.org/10.1123/iscj.2014-0098
56 57	719	Cattell, R. B. (1966). The scree test for the number of factors. Multivariate Behavioral
58 59 60	720	Research, 1(2), 245-276. https://doi.org/10.1207/s15327906mbr0102_10

1 2		
3	721	Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance.
4 5	722	Structural Equation Modeling: A Multidisciplinary Journal, 14(3), 464-504.
6 7	723	https://doi.org/10.1080/10705510701301834
8 9	724	Clark, L. A., & Watson, D. (2016). Constructing validity : Basic issues in objective scale
10	725	development. In A. E. Kazdin (Éd.), Methodological issues and strategies in clinical
12	726	research (p. 187-203). American Psychological Association.
13 14	727	https://doi.org/10.1037/14805-012
15 16	728	Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2003). Resources, instruction, and research.
17	729	Educational Evaluation and Policy Analysis, 25(2), 119-142.
18 19	730	https://doi.org/10.3102/01623737025002119
20 21	731	Cohen, J. (2013). Statistical power analysis for the behavioral sciences. Academic Press.
22 23	732	Cohen, L., Manion, L., & Morrison, K. (2013). Research methods in education. Routledge.
23	733	Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis : Four
25 26	734	recommendations for getting the most from your analysis. Practical Assessment,
27 28	735	Research, and Evaluation, 10(7), 86-99. https://doi.org/10.4135/9781412995627.d8
29	736	Cury, F., Sarrazin, P., Pérès, C., & Famose, J. P. (1999). Mesurer l'anxiété du sportif en
30 31	737	compétition : Présentation de l'Echelle d'Etat d'Anxiété en Compétition (EEAC)
32 33	738	[Measuring the athlete's anxiety in competition : Presentation of the Competitive State
34 35	739	Anxiety Inventory-2 (CSAI-2)]. In C. Le Scanff & J. P. Famose (Éds.), La gestion du
36	740	stress : Entraînement et compétition (p. 47-53). Dossier EPS.
37 38	741	Durand, M. (1996). L'enseignement en milieu scolaire [Teaching in school context]. Presses
39 40	742	universitaires de France.
41 42	743	Dziuban, C. D., & Shirkey, E. C. (1974). When is a correlation matrix appropriate for factor
43	744	analysis? Some decision rules. Psychological Bulletin, 81(6), 358-361.
44 45	745	https://doi.org/10.1037/h0036316
46 47	746	Eysenck, M. W., & Calvo, M. G. (1992). Anxiety and performance : The processing
48 40	747	efficiency theory. Cognition and Emotion, 6(6), 409-434.
50	748	https://doi.org/10.1080/02699939208409696
51 52	749	Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive
53 54	750	performance : Attentional control theory. Emotion, 7(2), 336-353.
55 56 57 58 59 60	751	https://doi.org/10.1037/1528-3542.7.2.336

1 2		
3	752	Eysenck, M. W., & Wilson, M. R. (2016). Sporting performance, pressure and cognition. In
5	753	D. Groome & M. Eysenck (Éds.), An Introduction to applied cognitive psychology (p.
6 7	754	329-350). Routledge.
8 9	755	Fournier, J., Gaudreau, P., Demontrond-Behr, P., Visioli, J., Forest, J., & Jackson, S. (2007).
10	756	French translation of the Flow State Scale-2 : Factor structure, cross-cultural
12	757	invariance, and associations with goal attainment. Psychology of Sport and Exercise,
13 14	758	8(6), 897-916. https://doi.org/10.1016/j.psychsport.2006.07.007
15 16	759	French, R. B. (1997). The teacher as container of anxiety : Psychoanalysis and the role of
17	760	teacher. Journal of Management Education, 21(4), 483-495.
18 19	761	https://doi.org/10.1177/105256299702100404
20 21	762	Garson, G. D. (2015). Missing values analysis & data imputation. Statistical Associates
22 23	763	Publishers.
23	764	Gaskin, C. J., & Happell, B. (2014). On exploratory factor analysis : A review of recent
25 26	765	evidence, an assessment of current practice, and recommendations for future use.
27 28	766	International Journal of Nursing Studies, 51(3), 511-521.
29	767	https://doi.org/10.1016/j.ijnurstu.2013.10.005
30 31	768	Grobe, R. P., & Pettibone, T. J. (1975). Effect of instructional pace on student attentiveness.
32 33	769	The Journal of Educational Research, 69(4), 131-134.
34 35	770	https://doi.org/10.1080/00220671.1975.10884855
36	771	Grossbard, J. R., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2009). Competitive anxiety in
37 38	772	young athletes : Differentiating somatic anxiety, worry, and concentration disruption.
39 40	773	Anxiety, Stress, & Coping, 22(2), 153-166.
41	774	https://doi.org/10.1080/10615800802020643
42	775	Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). Multivariate data analysis :
44 45	776	A global perspective. Upper Saddle River.
46 47	777	Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). A primer on partial least
48	778	squares structural equation modeling (PLS-SEM). SAGE Publications.
49 50	779	Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure
51 52	780	analysis : Conventional criteria versus new alternatives. Structural Equation
53 54	781	Modeling: A Multidisciplinary Journal, 6(1), 1-55.
55	782	https://doi.org/10.1080/10705519909540118
56 57	783	Isoard-Gautheur, S., Oger, M., Guillet, E., & Martin-Krumm, C. (2010). Validation of a
58 59	784	French version of the athlete burnout questionnaire (ABQ). European Journal of
60		

1 2		
3	785	Psychological Assessment, 26(3), 203-211. https://doi.org/10.1027/1015-
4 5	786	5759/a000027
6 7	787	Izquierdo, I., Olea, J., & Abad, F. J. (2014). Exploratory factor analysis in validation studies :
8 9	788	Uses and recommendations. Psicothema, 26(3), 395-400.
10	789	https://doi.org/10.7334/psicothema2013.349
12	790	Leconte, C. (2005). L'attention est-elle éducable? [Is it possible to teach attention?]. A.N.A.E.
13 14	791	Approche Neuropsychologique des Apprentissages chez l'Enfant, 17(2[82]), 108-112.
15 16	792	Little, R. J. A. (1988). A test of missing completely at random for multivariate data with
17	793	missing values. Journal of the American Statistical Association, 83(404), 1198-1202.
18 19	794	https://doi.org/10.1080/01621459.1988.10478722
20 21	795	Little, T. D., Lindenberger, U., & Nesselroade, J. R. (1999). On selecting indicators for
22	796	multivariate measurement and modeling with latent variables : When « good »
23 24	797	indicators are bad and « bad » indicators are good. Psychological Methods, 4(2),
25 26	798	192-211. https://doi.org/10.1037/1082-989X.4.2.192
27 28	799	Liukkonen, J., Barkoukis, V., Watt, A., & Jaakkola, T. (2010). Motivational climate and
29	800	students' emotional experiences and effort in physical education. The Journal of
30 31	801	Educational Research, 103(5), 295-308. https://doi.org/10.1080/00220670903383044
32 33	802	Maldonado, E., Zamarripa, J., Ruiz-Juan, F., Pacheco, R., & Delgado, M. (2019). Teacher
34 35	803	autonomy support in physical education classes as a predictor of motivation and
36	804	concentration in Mexican students. Frontiers in Psychology, 10, 2834.
37 38	805	https://doi.org/10.3389/fpsyg.2019.02834
39 40	806	McCarthy, P. J., Allen, M. S., & Jones, M. V. (2013). Emotions, cognitive interference, and
41	807	concentration disruption in youth sport. Journal of Sports Sciences, 31(5), 505-515.
42 43	808	https://doi.org/10.1080/02640414.2012.738303
44 45	809	Messick, S. (1995). Validity of psychological assessment : Validation of inferences from
46 47	810	persons' responses and performances as scientific inquiry into score meaning.
48	811	American Psychologist, 50(9), 741-749. https://doi.org/10.1037/0003-066X.50.9.741
49 50	812	Moran, A. P. (2016). The psychology of concentration in sport performers : A cognitive
51 52	813	analysis. Psychology Press.
53 54	814	Müller, S., Vallence, AM., & Winstein, C. (2018). Investigation of Perceptual-Motor
55	815	Behavior Across the Expert Athlete to Disabled Patient Skill Continuum can Advance
56 57	816	Theory and Practical Application. Journal of Motor Behavior, 50(6), 697-707.
58 59	817	https://doi.org/10.1080/00222895.2017.1408557
60		

Page 33 of 50

1 2		
3 4	818	Nideffer, R. M. (1976). Test of attentional and interpersonal style. Journal of Personality and
5	819	Social Psychology, 34(3), 394-404. https://doi.org/10.1037/0022-3514.34.3.394
6 7	820	Ntoumanis, N. (2005). A prospective study of participation in optional school physical
8 9	821	education using a self-determination theory framework. Journal of Educational
10	822	Psychology, 97(3), 444-453. https://doi.org/10.1037/0022-0663.97.3.444
12	823	Ocasio, W. (2010). Attention to attention. Organization Science, 22(5), 1286-1296.
13 14	824	https://doi.org/10.1287/orsc.1100.0602
15 16	825	Posner, M. I. (1980). Orienting of attention. Quarterly Journal of Experimental Psychology,
17	826	32(1), 3-25. https://doi.org/10.1080/00335558008248231
18 19	827	Randall, D. M., & Fernandes, M. F. (1991). The social desirability response bias in ethics
20 21	828	research. Journal of Business Ethics, 10(11), 805-817.
22	829	https://doi.org/10.1007/BF00383696
24	830	Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-
25 26	831	Crowne social desirability scale. Journal of Clinical Psychology, 38(1), 119-125.
27 28	832	https://doi.org/10.1002/1097-4679(198201)38:1<119::AID-
29	833	JCLP2270380118>3.0.CO;2-I
30 31	834	Riou, F., Boiché, J., Doron, J., Romain, AJ., Corrion, K., Ninot, G., d'Arripe-Longueville,
32 33	835	F., & Gernigon, C. (2012). Development and validation of the French Achievement
34 35	836	Goals Questionnaire for Sport and Exercise (FAGQSE). European Journal of
36	837	Psychological Assessment, 28(4), 313-320. https://doi.org/10.1027/1015-
37 38	838	5759/a000112
39 40	839	Rowe, A. D., Fitness, J., & Wood, L. N. (2014). The role and functionality of emotions in
41 42	840	feedback at university : A qualitative study. The Australian Educational Researcher,
43	841	41(3), 283-309. https://doi.org/10.1007/s13384-013-0135-7
44 45	842	Ryan, R. M., & Deci, E. L. (2017). Self-determination theory : Basic psychological needs in
46 47	843	motivation, development, and wellness. Guilford Publications.
48	844	Smith, R. E., Smoll, F. L., & Cumming, S. P. (2007). Effects of a motivational climate
49 50	845	intervention for coaches on young athletes' sport performance anxiety. Journal of
51 52	846	Sport and Exercise Psychology, 29(1), 39-59. https://doi.org/10.1123/jsep.29.1.39
53 54	847	Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of
55	848	multidimensional sport performance anxiety in children and adults : The Sport
56 57	849	Anxiety Scale-2. Journal of Sport and Exercise Psychology, 28(4), 479-501.
58 59 60	850	https://doi.org/10.1123/jsep.28.4.479

3 1	851	Solmon, M. A., & Lee, A. M. (1997). Development of an instrument to assess cognitive
5	852	processes in physical education classes. Research Quarterly for Exercise and Sport,
6 7	853	68(2), 152-160. https://doi.org/10.1080/02701367.1997.10607991
8 9	854	Spielberger, C. D. (1972). Anxiety as an emotional state. Anxiety-current trends and theory,
10	855	3-20.
11	856	Spielberger, C. D. (1983). Manual for the State-Trait Anxiety Inventory STAI (form Y) ('self-
13 14	857	evaluation questionnaire').
15 16	858	Standage, M., Duda, J. L., & Ntoumanis, N. (2005). A test of self-determination theory in
17	859	school physical education. British Journal of Educational Psychology, 75(3), 411-433.
18 19	860	https://doi.org/10.1348/000709904X22359
20 21	861	Terwee, C. B., Bot, S. D. M., de Boer, M. R., Van der Windt, D. A. W. M., Knol, D. L.,
22 23	862	Dekker, J., Bouter, L. M., & de Vet, H. C. W. (2007). Quality criteria were proposed
23	863	for measurement properties of health status questionnaires. Journal of Clinical
25 26	864	Epidemiology, 60(1), 34-42. https://doi.org/10.1016/j.jclinepi.2006.03.012
27 28	865	Tinsley, H. E. A., & Tinsley, D. J. (1987). Uses of factor analysis in counseling psychology
29	866	research. Journal of Counseling Psychology, 34(4), 414-424.
30 31	867	https://doi.org/10.1037/0022-0167.34.4.414
32 33	868	Van de Mortel, T. F. (2008). Faking it : Social desirability response bias in self-report
34 35	869	research. Australian Journal of Advanced Nursing, 25(4), 40-48.
36	870	van der Wel, P., & van Steenbergen, H. (2018). Pupil dilation as an index of effort in
37 38	871	cognitive control tasks : A review. Psychonomic Bulletin & Review, 25(6), 2005-2015.
39 40	872	https://doi.org/10.3758/s13423-018-1432-y
41 42	873	Vasconcellos, D., Parker, P. D., Hilland, T., Cinelli, R., Owen, K. B., Kapsal, N., Lee, J.,
43	874	Antczak, D., Ntoumanis, N., Ryan, R. M., & Lonsdale, C. (2020). Self-determination
44 45	875	theory applied to physical education : A systematic review and meta-analysis. Journal
46 47	876	of Educational Psychology, 112(7), 1444-1469. https://doi.org/10.1037/edu0000420
48	877	Velicer, W. F. (1976). Determining the number of components from the matrix of partial
49 50	878	correlations. Psychometrika, 41(3), 321-327. https://doi.org/10.1007/BF02293557
51 52	879	Verardi, S., Dahourou, D., Ah-Kion, J., Bhowon, U., Tseung, C. N., Amoussou-Yeye, D.,
53 54	880	Adjahouisso, M., Bouatta, C., Dougoumalé Cissé, D., Mbodji, M., Barry, O., Minga,
55	881	D. M., Ondongo, F., Tsokini, D., Rigozzi, C., Meyer de Stadelhofen, F., & Rossier, J.
56 57	882	(2010). Psychometric properties of the Marlowe-Crowne social desirability scale in
58 59		

Page 35 of 50

2		
3 ⊿	883	eight African countries and Switzerland. Journal of Cross-Cultural Psychology, 41(1),
5	884	19-34. https://doi.org/10.1177/0022022109348918
6 7	885	Wilson, M. R., Wood, G., & Vine, S. J. (2009). Anxiety, attentional control, and performance
8 9	886	impairment in penalty kicks. Journal of Sport and Exercise Psychology, 31(6),
10	887	761-775. https://doi.org/10.1123/jsep.31.6.761
11 12	888	Wulf, G., & Lewthwaite, R. (2016). Optimizing performance through intrinsic motivation and
13 14	889	attention for learning : The OPTIMAL theory of motor learning. Psychonomic Bulletin
15 16	890	& Review, 23(5), 1382-1414. https://doi.org/10.3758/s13423-015-0999-9
17	891	Zhang, T., Solmon, M. A., & Gu, X. (2012). The role of teachers' support in predicting
18 19	892	students' motivation and achievement outcomes in physical education. Journal of
20 21	893	Teaching in Physical Education, 31(4), 329-343. https://doi.org/10.1123/jtpe.31.4.329
22	894	Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated
23 24	895	learning : Relating grade, sex, and giftedness to self-efficacy and strategy use. Journal
25 26	896	of Educational Psychology, 82(1), 51-59. https://doi.org/10.1037/0022-0663.82.1.51
27 28	897	

# **Table 1.** Exploratory factor analysis with maximum likelihood method and internal consistency (Study 2)

	2	20-SSAQ Factor			18	18-SSAQ Factor			
	Ι	Π	III	IV	Ι	II	III	IV	
[I] Concentration on the task	α=	.88ª			α=	.88 <sup>b</sup>			
Item-1. I was concentrated to success the exercise	.78				.76				
Item-5. I was focused on the exercise	.67				.60				
Item-9. I was devoted to realize the exercise	.78				.81				
Item-13. I kept attentive throughout the exercise	.66				.53				
Item-17. I was concentrated to get the exercise done	.79				.73				
[II] Concentration due to the teacher		α=	.87ª			$\alpha = .$	87 <sup>b</sup>		
Item-2. The teacher directed my attention on what needed to be done		.56				.57			
<b>Item-6.</b> I felt that the teacher was helping me to be concentrated on the exercise		.79				.79			
<b>Item-10.</b> I felt that the teacher knew what to be done in order for me to be concentrated on the exercise		.83				.87			
Item-14. The teacher was able to capture my attention in order to get me involved in the exercise		.67				.68			
Item-18. I felt that the teacher was helping me focus better		.73				.76			
[III] Distraction away from the task		α	= .75ª				$\alpha = .7$	7 <sup>b</sup>	
Item-3 <sup>c</sup> . I made mistakes of inattention			.38						
Item-7. I happened to have my head in the clouds			.55				.60		
Item-11. I happened to be distracted			.76				.77		
<b>Item-15.</b> I happened to think about something else rather than the exercise			.53				.58		
Item-19. I was distracted by external events			.58				.73		
[IV] Distraction toward the teacher			α	= .75ª			α=	.79 <sup>b</sup>	
Item-4. During the exercise, I was distracted by the teacher				.71				.72	
Item-8. I happened to be distracted by what the teacher was doing				.73				.70	
Item-12. Some teacher's explanations distracted me during the exercise				.69				.66	
<b>Item-16.</b> I happened to be distracted by what the teacher was talking about				.67				.67	
<b>Item-20</b> <sup>C</sup> . I directed more my attention to the teacher than to the exercise		.32							

Note. a = Cronbach's alpha of 20-SSAQ; b = Cronbach's alpha of 18-SSAQ; c = items excluded from 18-SSAQ; To facilitate the reading, all values < .32 were not reported; English items have not been validated; French validated items are available in Supplementary file 1.

Page 37 of 50

1

2
3
4
С
6
7
8
0
9
10
11
12
12
13
14
15
16
17
17
18
19
20
 21
21
22
23
24
25
26
20
27
28
29
30
31
32
22
33
34
35
36
27
20
38
39
40
41
42
.∠ ∕\⊃
45
44
45
46
47
48
40
49
50
51
52
52
22
54
55
56
57

58 59 60

Table 2. Factor correlations, variances, means, standard deviations and internal consistencies (Study 3)

	1	2	3	4	CR	AVE	ASV	Μ	SD
1. Concentration on the task	.87	.41***	55***	n.s	.88	.59	.16	5.28	1.08
2. Concentration due to the tea	acher	.90	<b>-</b> .18**	n.s	.89	.62	.07	4.82	1.44
3. Distraction away from the t	ask		.80	.23**	.81	.51	.13	3.24	1.59
4. Distraction toward the teach	ner			.76	.77	.47	.02	1.75	.98

Note.  $\alpha$  = diagonals; CR = Composite Reliability; AVE = Average Variance Extracted; ASV = Average Shared Variance; M. = Mean; SD = Standard Deviation; n.s = no significant; \*\* = p < .01; \*\*\* = p < .001

P(t) = P(t) + P(t) +

	SC	C <mark>S</mark> A	S <mark>S</mark> A	Soc Des
Concentration on the task	n.s	n.s	n.s	n.s
Concentration due to the teacher	n.s	n.s	n.s	n.s
Distraction away from the task	19**	n.s	.20 <sup>***</sup>	21**
Distraction toward the teacher	n.s	.15*	.14*	15*
Mean	3.02	1.71	1.48	7.08
Standard Deviation	.68	.78	.49	2.77
Cronbach's alpha	.89	.91	.66	.64

 Table 3. Outcomes correlations, descriptive statistics and internal consistencies (Study 3)

Note. SC = Self-Confidence; CSA = Cognitive State Anxiety; SSA = Somatic State Anxiety excluding the item 4; Soc Des = Social Desirability;n.s = no significant; <math>\* = p < .05; \*\* = p < .01; \*\*\* = p < .001

n.s = no significant; \* = p < .05; \*\* = p < .01; \*\*\* = p < .001

Model	χ²(df)	RMSEA (90% CI)	CFI	TLI	СМ	$\Delta \chi^2$ ( $\Delta df$ )	A RMSEA	Δ CFI	ΔTLI
a: Configural	417.170 (256)***	.054 (.045064)	0.917	0.900	-	-	-	-	-
b: Metric	432.080 (270)***	.053 (.044062)	0.916	0.905	a	14.910 (14)	001	001	.005
c: Scalar	457.969 (288)***	.053 (.043061)	0.912	0.906	b	25.889 (18)	.000	004	.001

 Table 4. Measurement invariance testing across gender groups (Study 3)

Note. The subsamples for the different measurement invariance analyses were women (n = 96), and men (n = 120); df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; Cl = Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; CM = comparison model; \*\*\* = p < .001.

URL: http://mc.manuscriptcentral.com/rijs

Table 5. I	Factor	correlations,	variances,	means,	standard	deviations	and	internal	consister	ncies
(Study 4)										

	1	2	3	4	CR	AVE	ASV	Μ	SD
1. Concentration on the task	.90	.47***	55***	19***	.90	.64	.19	5.28	1.27
2. Concentration due to the tea	cher	.87	26***	15**	.86	.56	.10	4.69	1.46
3. Distraction away from the ta	ask		.76	.42***	.76	.45	.18	3.47	1.62
4. Distraction toward the teach	er			.73	.74	.42	.08	2.06	1.21

Note.  $\alpha$  = diagonals; CR = Composite Reliability; AVE = Average Variance Extracted; ASV = Average Shared Variance; M. = Mean; SD = Standard Deviation; n.s = no significant; \*\* = p < .01; \*\*\* = p < .001





#### Supplementary file 1. Item comprehension of the pool of 20 items in Study 1

Items	Μ	SD	Problem mentioned during the interview
CTASK1. J'étais concentré(e) pour réussir l'exercice.	6.00	.00	8
<b>CTEACHER</b> 2. J'ai eu l'impression que l'enseignant savait quoi faire pour que je me concentre sur l'exercice.	5.80	.63	"SAVAIT QUOI FAIRE"
DISTASK3. Il m'est arrivé(e) d'être déconcentré(e).	6.00	.00	
<b>DISTEACHER4</b> . Pendant l'exercice, j'ai été déconcentré(e) par l'enseignant.	6.00	.00	
CTASK5. J'étais focalisé(e) sur l'exercice.	6.00	.00	
<b>CTEACHER6</b> . J'ai senti que l'enseignant m'aidait à me concentrer sur l'exercice	5.90	.32	"J'AI SENTI"
DISTASK7. Il m'est arrivé(e) d'être dans la lune	5.90	.32	"EST ARRIVE"
<b>DISTEACHER8</b> . Il m'est arrivé(e) d'être déconcentré(e) par ce que faisait l'enseignant.	6.00	.00	
CTASK9. Je me suis appliqué(e) à réaliser l'exercice	6.00	.00	
<i>CTEACHER</i> 10. L'enseignant a su diriger mon attention sur ce qu'il fallait faire.	6.00	.00	
DISTASK11. J'ai commis des erreurs d'inattention.	6.00	.00	
<b>DISTEACHER12.</b> Certaines explications de l'enseignant m'ont distrait pendant l'exercice	5.80	.42	"DISTRAIT"
<i>CTASK13. Je suis resté(e) attentif(ve) tout le long de l'exercice</i>	6.00	.00	
<b>CTEACHER</b> 14. L'enseignant a su capter mon attention pour que je m'implique dans l'exercice.	6.00	.00	
<b>DISTASK</b> 15. Il m'est arrivé(e) de penser à autre chose plutôt qu'à l'exercice.	5.90	.32	SAISI MAL LE SENS GENERAL
<b>DISTEACHER</b> 16. Il m'est arrivé(e) d'être déconcentré(e) par ce que disait l'enseignant.	6.00	.00	
CTASK17. J'étais concentré(e) pour réaliser l'exercice.	6.00	.00	
<i>CTEACHER</i> 18. J'ai eu l'impression que l'enseignant m'aidait à mieux me concentrer.	5.90	.32	SAISI MAL LE SENS GENERAL
DISTASK19. J'ai été distrait(e) par des événements extérieurs	5.80	.42	"EVENEMENTS EXTERIEURS"
<b>DISTEACHER2</b> 0. J'étais davantage concentré(e) sur l'enseignant que sur l'exercice.	5.50	.85	SAISI MAL LE SENS GENERAL

Note. n = 10 sport sciences students

Supplementary	file 2.	Scoring	distribution	of the SSA	Q in Stuc	$ v ^2$	, 3 and	d 4
---------------	---------	---------	--------------	------------	-----------	---------	---------	-----

		Study 2			Study 3			Study 4	
Items	M (SD)	Skew	Kurt	M (SD)	Skew	Kurt	M (SD)	Skew	Kurt
CTASK1	4.65	-1.65	-1.17	5.12	-2.30	-1.64	5.34	-5.02	81
CTEACHER2	4.81	-1.85	-1.61	5.61	-7.18	3.63	5.50	-9.87	2.19
DISTASK3	3.09	1.61	-2.96	-	-	-	-	-	-
DISTEACHER4	(1.72) 1.68 (1.32)	12.14	14.36	1.45	16.07	23.56	1.72	19.75	18.14
CTASK5	(1.52)	-1.85	-1.47	(.97) 5.19	-3.32	-1.26	(1.41) 5.12 (1.52)	-5.44	-1.26
CTEACHER6	(1.43) 4.09	34	-1.83	(1.32) 4.48	-2.38	-2.72	(1.55) 4.49	-3.51	-3.74
DISTASK7	(1.56) 2.74	4.37	-1.53	(1.86) 2.73	5.13	-2.18	(1.85) 3.17	4.38	-5.47
DISTEACHER8	(1.92)	10.08	7.48	(2.03)	13.49	13.99	(2.16) 1.96	15.84	9.32
CTASK9	(1.50) 5.52	-4.19	1.03	(1.25) 5.73	-6.34	3.19	(1.63) 5.61	-10.39	4.58
CTEACHER10	(1.22) 4.27	-1.02	-1.76	(1.21) 4.74	-3.80	-1.12	(1.41) 4.48	-2.79	-4.32
DISTASK11	(1.60) 3.77	.87	-3.29	(1.69) 3.61	.99	-3.95	(1.88) 3.87	.34	-6.04
DISTEACHER12	(1.89) 2.13	7.53	4.20	(2.02) 1.94	9.93	4.86	(2.11) 2.33	10.68	.79
CTASK13	(1.41) 4.64	-2.34	-1.48	(1.53) 5.01	-3.33	80	(1.78) 4.99	-5.54	-1.97
CTEACHER14	(1.54) 4.50	92	-1.46	(1.50) 4.94	-4.08	69	(1.68) 4.80	-5.27	-1.89
DISTASK15	(1.43) 3.94	13	-3.48	(1.67) 3.72	.48	-4.18	(1.73) 3.88	.24	-6.44
DISTEACHER16	(2.06) 2.22	7.70	4.88	(2.06) 1.94	9.24	4.75	(2.16) 2.25	11.35	2.71
CTASK17	(1.49) 5.04	-4.35	1.13	(1.37) 5.34	-4.42	.80	(1.67) 5.36	-8.61	2.02
CTEACHER18	(1.46) 3.95	64	-1.43	(1.28) 4.33	-2.25	-2.77	(1.52) 4.19	-2.00	-4.48
DISTASK19	(1.51) 3.20	2.25	-2.77	(1.83) 2.92	3.53	-2.89	(1.91) 2.95	5.69	-4.51
DISTEACHER20	(1.94) 2.16	7.23	4.06	(1.90)	_	-	(2.08)	-	_
CTASK	(1.43)	-2.22	-0.64	5.28	-3.56	-0.06	5.28	-6.59	0.33
CTEACHER	(1.18) 4 32	-0.72	-1 33	(1.08) 4 82	-3 39	-1 38	(1.27) 4 69	-3.52	-2.57
DISTASK	(1.24) 3 42 <sup>a</sup>	2 22ª	-1 46ª	(1.44) 3 24	2.02	-2.86	(1.46) 3 47	2.02	_3.98
DISTEACHER	(1.53) 1.99 <sup>b</sup>	8.32 <sup>b</sup>	8.12 <sup>b</sup>	(1.59) 1.75	10.67	10.74	(1.62) 2.06	11.58	5.42
	(1.11)			(.99)			(1.21)		

Note. Study 2: n = 164 sport sciences students; Study 3: n = 216 sport sciences students; Study 4: n = 481 high school students; M = Mean; SD = Standard Deviation; Skew. = Skewness value; Kurt. = Kurtosis value; CTASK = Concentration on the task. CTEACHER = Concentration due to the teacher. DISTASK = Distraction away from the task. DISTEACHER = Distraction toward the teacher; a = DISTASK skewness and kurtosis scores were calculated without DISTASK3; b = DISTEACHER skewness and kurtosis scores were calculated without DISTASK3; b = DISTEACHER skewness and kurtosis scores were calculated without DISTASK3; b = DISTEACHER skewness and kurtosis scores were calculated without DISTEACHER20

Supplementary file 2. Frequency tables of the answers to items of the SSAQ in Study 2, Study 3 and Study 4

Study 2	1	2	3	4	5	6	7
CTASK1	1	5	13	26	23	26	6
CTEACHER2	2	5	13	23	18	26	13
DISTASK3	24	21	11	18	15	9	1
DISTEACHER4	68	13	6	7	0	2	2
CTASK5	1	5	10	21	24	22	16
CTEACHER6	5	13	18	23	23	13	6
DISTASK7	40	18	12	9	10	7	5
DISTEACHER8	58	24	2	5	3	4	2
CTASK9	1	1	5	15	19	37	22
CTEACHER10	5	9	15	27	16	20	7
DISTASK11	11	24	12	15	13	16	9
DISTEACHER12	44	29	10	10	3	3	1
CTASK13	3	7	14	19	21	27	9
CTEACHER14	1	9	14	25	26	18	8
DISTASK15	16	17	7	15	17	13	14
DISTEACHER16	43	26	15	9	3	2	3
CTASK17	4	2	7	20	20	33	13
CTEACHER18	7	12	17	28	20	12	4
DISTASK19	28	17	12	15	13	9	7
DISTEACHER20	45	26	12	12	3	2	2

Note. n = 164; values are expressed i	n percentage.						
Study 3	1	2	3	4	5	6	7
CTASK1	0	3	9	19	26	28	15
CTEACHER2	2	1	6	9	19	29	33
DISTASK3	75	14	4	4	2	0	0
CTASK5	0	3	9	16	24	33	15
CTEACHER6	10	8	11	19	14	23	15
DISTASK7	44	19	4	9	10	7	2
DISTEACHER8	70	13	7	3	5	1	1
CTASK9	0	1	3	10	19	35	31
CTEACHER10	6	8	4	23	19	25	14
DISTASK11	21	19	8	13	18	11	10
DISTEACHER12	61	17	5	6	5	5	1
CTASK13	2	3	11	19	21	26	17
CTEACHER14	6	3	10	19	19	25	19
DISTASK15	21	16	11	9	18	14	10
DISTEACHER16	56	19	11	6	6	2	0
CTASK17	0	3	5	15	25	33	19
CTEACHER18	11	9	11	18	19	22	11
DISTASK19	35	18	9	13	12	8	4

*Note. n* = 216; *values are expressed in percentage* 

	1	2	3	4	5	6	7
CTASK1	1	1	8	16	27	23	25
CTEACHER2	3	4	5	10	17	26	35
DISTASK3	70	15	4	5	3	3	1
CTASK5	2	4	10	16	22	24	22
CTEACHER6	10	7	11	19	18	19	16
DISTASK7	36	14	7	11	13	7	11
DISTEACHER8	63	15	5	6	5	3	4
CTASK9	2	2	6	9	19	31	32
CTEACHER10	9	10	11	19	17	16	18
DISTASK11	20	15	8	16	15	11	16
DISTEACHER12	51	17	7	8	7	6	3
CTASK13	4	5	10	16	19	23	22
CTEACHER14	7	6	7	22	19	21	19
DISTASK15	21	15	9	10	16	13	16
DISTEACHER16	51	17	9	10	6	3	3
CTASK17	3	3	6	14	19	29	26
CTEACHER18	14	8	12	21	16	16	13
DISTASK19	40	14	9	11	12	7	9
ote. $n = 481$ ; values are expressed in p	ercentage.					· ·	
Note. n = 481; values are expressed in p	ercentage.			2			



Note. CSA = Cognitive State Anxiety; SSA = Somatic State Anxiety excluding the item 4; SC = Self-Confidence



Note. Soc Des = Social Desirability







Note. Study 3: n = 216 sport sciences students. CTASK = Concentration on the task. CTEACHER = Concentration due to the teacher. DISTASK = Distraction away from the task. DISTEACHER = Distraction toward the teacher



Note. Study 4: n = 481 high school students. CTASK = Concentration on the task. CTEACHER = Concentration due to the teacher.DISTASK = Distraction away from the task. DISTEACHER = Distraction toward the teacher