Conceptions of sport ability and practice of sport: an implicit measure

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Conceptions of sport ability and practice of sport: an implicit measure

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People may endorse two conceptions of the nature of sport ability: an entity theory (sport ability is considered innate, stable, a gift, a talent) and an incremental theory (sport ability is improvable, linked to training and effort). Previous studies (e. g., Biddle et al., 2003) have used explicit methods to assess these beliefs. Using an implicit measure (ST-IAT, Single-Target Implicit Association Test) in order to overcome the social desirability which might be induced by self-reported measures, this study examined (1) whether automatic and implicit conceptions of sportspersons and non-sportspersons differed, and (2) the correlation between IAT score and explicit perceived competence in sport. The results showed that sportspersons automatically associated sport with training rather than talent, whereas non-sportspersons had an easier association between sport and talent. Even if sportspersons had higher perceived competence in sport than non-sportspersons, the IAT score was not related to perceived competence.

KEY WORDS: Entity, Implicit theory, Incremental, Implicit Association Test, Non-sportspersons, Perceived competence, Sport ability beliefs.

In a context of declining physical activity and increasing obesity (Ng & Popkin, 2012), it is important to understand the motivational factors associated with physical activity and sport. Beliefs, such as implicit theories, can affect a person's cognition, affect and behaviour in achievement areas, and can influence a person's interpretation of events. The inaugural works of Dweck (1986) and Dweck and Leggett (1988) highlighted implicit theories of intelligence, i.e. what individuals think about the nature of intelligence. Two conceptions of the nature of intelligence were identified: an entity theory (intelligence is innate, stable, a gift, a talent) and an incremental theory (intelligence is improvable, linked with work and effort). Implicit theories are not the reality, but rather personal beliefs. In education, literature reviews (e.g., Dweck & Molden, 2005) showed that incremental theory was related to

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adaptive outcomes, whereas entity theory was a negative predictor of student performance.

Following these initial works conducted in the academic domain, sport studies have focused on the distinction between the entity and incremental theories (Biddle et al., 2003; Sarrazin et al., 1996). Entity theory considered sport or athletic ability improvable with effort and training, and incremental theory considered sport ability innate, stable, depending on genetics, gift or talent. Sarrazin et al. (1996) created the first self-reported scale to identify implicit theories of sport ability, called the Conceptions of the Nature of Athletic Ability Questionnaire (CNAAQ). This first questionnaire was revised by Biddle et al. (2003), who created the CNAAQ-2. Results in sport literature confirmed the results in academic domain. Incremental and entity theories were respectively linked with adaptive and maladaptive outcomes. For example, entity beliefs predicted amotivation towards physical education and sport (Biddle et al., 2003), reduced effort (Chen et al., 2008) or self-handicapping (Ommundsen, 2001), whereas incremental beliefs about athletic ability were positively linked with enjoyment of sport (Chian & Wang, 2008), intrinsic motivation (Moreno et al., 2010) or perceived competence (Cury et al., 2002).

Several studies (Chian & Wang, 2008; Wang & Biddle, 2001; Wang et al., 2002) have used cluster analysis including sport ability beliefs, in order to identify subgroups of participants with differentiated motivational patterns. Amotivated group and low motivated groups showed amotivation, low incremental beliefs, low perceived competence, low sport and physical activity. On the contrary, highly motivated group showed low amotivation, high incremental beliefs, high perceived competence, high sport and physical activity participation. These results highlighted that sport ability beliefs may influence sport participation. Incremental and entity beliefs were respectively negatively and positively linked with amotivation (Wang et al., 2002). The amotivated individuals perceived that there is little or no purpose in continuing with the activity (Vallerand & Fortier, 1998). They tended to reject sport participation, and there is a great risk of becoming less physically active and even abandoning sport. Further investigations on this question were promising to explore to what extent conceptions of sport ability among sportspersons and non-sportspersons differ.

Consequently, assessing representations of sport ability is inescapable in order to understand behaviours in a sport context. People with an incremental theory seek to increase their skills and competencies, choose adapted challenges, and consider that mistakes are part of learning process. People with an entity theory develop negative affects and cognitions when they face a problem, so they readily tend to give up the task or to reduce their invest-

ment when they think they could fail. It might be difficult for some people to admit that they think sport ability depends on talent, gift or genetics and cannot be improved, because that would be like saying that they were not themselves talented or gifted in sport. Consequently, self-reported measures about conceptions of the nature of athletic ability, such as CNAAQ (Sarrazin et al., 1996) or CNAAQ-2 (Biddle et al., 2003), may be subject to social desirability (e.g., Crosby, Bromley, & Saxe, 1980; Crowne & Marlowe, 1960). Social desirability is the tendency of respondents to answer questions in order to be viewed favourably by others, to present themselves at their best. Subjects' desire to be perceived positively is widely assumed to be a potential source of distortion of self-report measures (Greenwald & Banaji, 1995). Even if the reliability of self-reported measures about implicit theories of sport ability were evidenced and confirmed, we might think that social desirability would prevent some persons from explicitly declaring an entity theory of sport ability. Indeed, in all studies about conceptions of the nature of sport ability (e.g., Biddle et al., 2003; Cury et al., 2002; Moreno et al., 2010; Ommundsen, 2001; Wang, Chatzisarantis, Spray, & Biddle, 2002; Wang et al., 2009), incremental scores are higher than entity scores, even for clusters called "amotivated" by sport (Chian & Wang, 2008; Wang & Biddle, 2001).

To evaluate implicit cognitive constructs, the Implicit Association Test (IAT) provides a computer-based measure of strengths of automatic associations (Greenwald, McGhee, & Schwartz, 1998), especially in the domains of stereotypes and identity (e.g., Greenwald, Nosek, & Banaji, 2003). When a person is quick to pair a concept and an attribute, the implicit association between them is considered strong. For example, Nosek, Banaji and Greenwald (2002) studied the maths-gender stereotype using the latency of association of lexical stimuli in one compatible condition (like "math-male" and "arts-female") compared to an incompatible condition (like "math-female" and "arts-male"). In the IAT procedure, many attitude objects had a complementary category (Greenwald & Farnham, 2000), as for examples *male* and *female*, or *math* or *liberal arts*. But IAT cannot highlight the evaluative associations with a single-target concept. Therefore, Karpinski and Steinman (2006) created the Single Category Implicit Association Test (SC-IAT), which is a modified version of the IAT that eliminates the need for the second contrast category. The choice between IAT and SC-IAT depends on the research question, and the SC-IAT seems more beneficial when a naturally opposing category is unavailable (Karpinski & Steinman, 2006), like the category *sport* in the present study.

Despite minor procedural differences, SC-IAT was conceptually identical to the Single-Target IAT used here (ST-IAT; Bluemke & Friese, 2008; Wigboldus, Holland, & van Knippenberg, 2004). ST-IAT included an initial

practice stage with only good and bad target words, had fewer target words in each stage and did not use a response window for slow answers (Karpinski & Steinman, 2006). The reliability and the validity of the ST-IAT was tested and validated across different attitude domains (Bluemke & Friese, 2008). Up to date, there was no IAT, SC-IAT or ST-IAT that identified implicit theories about conceptions of the nature of sport ability.

The aims of the present study were to develop a ST-IAT which could highlight whether the automatic and implicit conceptions of sportspersons and non-sportspersons differed, and to study if the correlation between conceptions of ability and perceived competence previously identified using explicit measures was still valid with an IAT measure.

Method

Participants and procedure

Participants

Data were collected in France from 117 voluntary participants (82 men, 35 women, M_{age} = 26.57 years, age range: 18-29 years). Two groups were constituted: sportspersons and non-sportspersons. All the sportspersons (95 participants) were competitors and licence-holders in a club affiliated to a sport federation. They were not high-level sportspersons or professionals. One group of non-sportspersons was also constituted with participants who declared they were not licence-holders. They did not engage in organised sport activities, defined as having a regular schedule and being part of a formal, organised group, such as a recreational group or organisation (Slutzky & Simpkins, 2009). Moreover, they did not practice informal sport or did so for less than an hour a month. We are in line with Wang et al.'s (2002) work, in which the lower category of the duration of time participants engaged in sport activities was less than an hour per week. Lastly, participants who had been sportspersons and competitors in the past were excluded from the study. Consequently, 22 participants represented those individuals who did not, and had never, participated in sport. The sample size is low, but we have used stringent criteria for inclusion in this group to focus on their specific implicit beliefs about sport ability. Moreover, small sample sizes may be used with IAT procedure (e. g., Greenwald et al., 1998). Even if all participants in the present study were representative of the repartition between sportspersons and non-sportspersons in France (Mignon & Truchot, 2002), future studies should be conducted with larger samples of non-sportspersons.

Stimuli and pilot test

Twenty nouns selected by fifteen lecturers specialised in the sport domain were used as lexical stimuli: ten *talent* words and ten *training* words. The words were rated by 100 undergraduates in the sport domain for the degree to which they were talent-related or training-related on a 5-point scale (1 = *strongly linked to talent*, 3 = *neither talent-linked nor training-*

linked, 5 = *strongly linked to training*). Only the eight words with the best scores were retained for talent (genetic, predisposition, innate, natural, aptitude, birth, genius, potential) and for training (work, planning, preparation, programme, repetition, method, progression, improvement). The *talent* words were rated as more talent-related (M = 1.98, SD = 1.06) than were the *training* words, and the *training* words were rated as more training-related (M = 4.15, SD = 1.06) than the *talent words*. Word length was controlled by counting the numbers of letters, and there were no significant differences ($t(14) = -1.31$, $p = .21$) between *talent* words (M = 8.25, SD = 3.06) and *training* words (M = 10.00, SD = 2.20). For sport stimuli, the eight words used by Clément-Guillotin, Chalabaev and Fontayne (2011) were added to four other words selected by the same 15 lecturers. Then, these twelve *sport* words were rated by the same 100 undergraduates for their degree of link with sport on a 5-point scale (1 = *not at all*, 5 = *extremely*). The eight words with the most extreme evaluation were kept (M = 3.70, SD = 1.37), as the eight *sport* words used in the ST-IAT (team, stadium, changing room, competition, match, rankings, podium, medal). Based on these ratings, the 24 words were selected and used as lexical stimuli.

Design and procedure

Each participant was seated alone at a desk with a personal computer with a 15" monitor using Inquisit 3 software. The participants were briefly instructed that the experiment would test their reaction times and that they should assign the stimuli which appeared in the centre of the screen to different categories as quickly and correctly as possible. Participants placed one finger on the *E* key (the left key) of the keyboard and another finger on the *I* key (the right key). Each stage was preceded by a set of written instructions concerning the purpose of the task and the appropriate key responses. A screenshot of the IAT is provided in Figure 1. In this example, the word *genetic* (related to the attribute *talent*) appeared in the centre

Fig. 1 - Screenshot of the ST-IAT.

of the screen. So the participant must press the left-key response as fast as possible. If a *sport* word (e. g., *team*, *competition*) appeared in the centre of the screen, the participant must also press the left-key response. If a *training* word (e. g., *work*, *method*) appeared, the participant must press the right-key response. The category *sport* was then switched to the right key for the other half of the task.

Following the ST-IAT procedure (Bluemke & Friese, 2008), the measure consisted of 80 trials divided into two combined blocks. Participants started with a training block (20 trials) for the evaluative words prior to each combined block. Each stimulus was presented at least twice, adding up to 40 trials per combined block. The procedure is presented in Table I. Following the protocol suggested by Bluemke and Friese (2008), individual responses less than 300ms, responses more than 3,000ms, and nonresponses were eliminated. Data from participants who had an error rate over 20% on the ST-IAT were removed from analyses. All participants met the error rate criterion, so all participants were included in the results.

Measures

Talent-Training – IAT (TT-IAT)

The difference in response latency between the average speed of response to sport and talent items when they were paired together, and the average speed of response to sport and training items when they were paired together was used. ST-IAT scores were computed by using the D-score algorithm (Greenwald et al., 2003) applied to the ST-IAT data (Bluemke & Friese, 2006, 2008). Sport was the target concept and talent and training were the attribute concepts. In the present study, in order to examine more specifically the entity theory of sport ability, which is more likely to be sensitive to social desirability, sport-talent was considered a compatible condition, and sport-training an incompatible one. If participants' IAT score is positive and superior to 0.15 (Greenwald et al., 2003), this would show that they have a higher association between sport and talent than sport and training, evidencing that they are more likely to hold to an entity theory. If IAT score is negative, it is the opposite.

Table I
Category Assignment And Stimulus Proportions Across ST-IAT Blocks For An Exemplary Participant

Block	Trials	Function	Left-key response	Right-key response
1	20	Practice	*Talent* words + *Sport* words	*Training* words
2	40	Test	*Talent* words + *Sport* words	*Training* words
3	20	Practice	*Training* words + *Sport* words	*Talent* words
4	40	Test	*Training* words + *Sport* words	*Talent* words

Perceived competence

This subscale was assessed with Durand, Cury, Sarrazin, and Famose's (1996) French translation from the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989). Participants responded to the four perceived competence items (e.g., "I think I am pretty good at sport") using a 1 (strongly disagree) to 5 (strongly agree) scale. Internal consistency was good for perceived competence ($\alpha = .92$).

Results

In the Implicit Association Test analysis (e.g., Bluemke & Friese, 2008; Greenwald et al., 2003; Karpinski & Steinman, 2006), the ST-IAT revealed a negative slight to medium-sized association between sport and talent ($D = -0.23$) for the whole population, evidencing that participants had a stronger implicit association between sport and training than between sport and talent. The whole population was representative of the repartition between sportspersons and non-sportspersons in France (Mignon & Truchot, 2002). Separate analyses revealed a negative slight to medium-sized association between sport and talent ($D = -0.32$) for sportspersons, and a positive slight to medium-sized association between sport and talent ($D = 0.17$) for non-sportspersons. There was a significant difference ($t(115) = -7.04$, $p < .0001$) between sportspersons' IAT score ($M = -0.32$, $SD = 0.30$) and non-sportspersons' IAT score ($M = 0.17$, $SD = 0.26$), evidencing that non-sportspersons implicitly associated sport more often with talent than sportspersons, who had a higher implicit association between sport and training than between sport and talent.

The IAT score was not correlated with perceived competence of sportspersons ($r = -.01$, $p = .92$) and non-sportspersons ($r = -.29$, $p = .20$). A t test conducted on perceived competence revealed a significant effect of practising sport ($t(115) = 4.36$, $p < .0001$). Sportspersons had higher perceived competence in sport ($M = 3.81$, $SD = 0.82$) than non-sportspersons ($M = 2.89$, $SD = 1.14$).

Discussion

The aims of the present study were on one hand to highlight with implicit measures automatic associations between sport and talent/training according to the practice of sport or not, and on the other hand to identify correlations between this implicit measure and self-reported perceived competence in sport. The results showed that non-sportspersons had a higher

automatic association between sport and talent than between sport and training, contrary to sportspersons. If people believe that athletic ability cannot change, it is easier for them to build this automatic association between sport and talent. Reasons for being non-sportspersons are numerous, but some non-sportspersons may think that they were not born to practice sport. They have developed the belief that sport ability is relatively stable and related to talent, which they doubted that they sufficiently possessed. According to Biddle et al. (2003), entity beliefs were strong predictors of amotivation. Believing that athletic ability is a gift and is stable appears to be motivationally maladaptive, and may account for the absence of sport practice for this specific group. Consequently, non-sportspersons implicitly and automatically associated sport more often with talent than sportspersons. These results were in line with those found with explicit measures (Wang & Biddle, 2001; Wang et al., 2002). The interest of implicit measures like ST-IAT is to overcome the social desirability biases of explicit and self-reported measures which can be distorted or deformed by participants (Greenwald et al., 1998). Indeed, for non-sportspersons, admitting that sport ability depends on talent and cannot be improved is an indirect way to confess that they are not talented or gifted enough to practice sport themselves. In studies with explicit measures, incremental scores are higher than entity scores even for clusters called "amotivated" by sport (Chian & Wang, 2008; Wang & Biddle, 2001), which may indicate some form of social desirability. With implicit measures based on a response time paradigm, there is lack of dependence on introspective access to the association strengths being measured (Greenwald et al., 2003) and therefore a limitation of social desirability, which will reveal participants with an automatic association between sport and talent that a self-reported measure may not identify.

By contrast, sportspersons had a stronger implicit association between sport and training than between sport and talent. This implicit result was in line with explicit ones, in which participation in sport was positively related to incremental beliefs (Chian & Wang, 2008). Social desirability had less impact on incremental theorists than on entity theorists, because effort, work and training are often valued socially in the sport context. Time spent in sport activities affords opportunities to build sport competencies and, in turn, the practitioners' self-concept of their abilities (Slutzky & Simpkins, 2009). Sportspersons adopted a daily or frequent practice of training. Consequently, they are more likely to automatically associate sport with training in the TT-IAT.

Furthermore, studies using explicit measures showed that participants with high perceptions of sport competence tended to endorse explicit incre-

mental beliefs and participants with low perceptions of sport competence tended to endorse entity beliefs (e.g., Biddle et al., 2003; Cury et al., 2002; Moreno et al., 2010; Ommundsen, 2001; Wang et al., 2009). In line with the literature (e. g., Chian & Wang, 2008; Wang et al., 2002), results of the present study showed that sportspersons had higher explicit perceived competence in sport than non-sportspersons. As noted earlier, TT-IAT scores were different between these two groups, evidencing different automatic associations between sport, talent and training. However, explicit perceived competence of sportspersons and non-sportspersons was not correlated with their respective TT-IAT scores. Concerning non-sportspersons, the negative correlation between perceived competence and IAT score was high and in line with explicit literature (e. g., Cury et al., 2002), but it was not significant principally as a result of the low sample size of this group. Moreover, TT-IAT is not a measure of incremental or entity beliefs, contrary to the explicit CNAAQ-2. IAT was assumed to be a measure of the relative strength of association between concept-attribute pairs (Nosek et al., 2005). For example, our results evidenced the fact that sportspersons automatically associated sport and training in the IAT, but that did not mean the association between sport and talent has been rejected. The results indicated the strength of respondents' automatic preferences for talent relative to training – that is, differential association of talent and training with sport. Consequently, perceived competence may be linked with different patterns of IAT scores, but the lack of association between these measures was somewhat surprising. However, one of the central topics on unconscious processes is the link between implicit and explicit measures (e. g., Greenwald & Banaji, 1995), and the literature on this relationship is inconclusive (Fazio & Olson, 2003). Further research is warranted to better understand the relations between explicit measure of perceived competence and implicit measure of conceptions of sport ability. The development of an implicit measure of perceived competence in sport, likely to be less sensitive to social desirability, could also be considered.

In conclusion, the use of an implicit measure like ST-IAT in this study showed that it is useful in order to overcome the social desirability which could appear with non-sportspersons who would not dare confess that they thought sport ability was not improvable and mainly linked to talent, gift and genetics. Furthermore, highlighting beliefs about sport ability with implicit and/or explicit measures is an important way to understand the determinants of practice of sport, especially to identify the reasons why some people do not practise sport and to encourage them to start it.

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