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Original articles

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WHO WAS THE BETTER ATHLETE?
WHICH WAS THE BETTER TEAM?

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ABSTRACT

Often, there is disagreement about who is the better athlete, or the better team. The aim of this paper is to clarify a recent disagreement between the author (Mika Hämäläinen) and Arvi Pakaslahti about different views of 'betterness' in sport competitions. I introduced a 'three criteria' model of betterness, which suggested the following three criteria: the official result, the ideally adjudicated result and the display of athletic skills. Pakaslahti criticised my account and introduced his own model, which has two built-in ideals of sport competitions: the Athletic Superiority Ideal and the Just Results Ideal. I argue that when we look behind the terminological differences, there is surprisingly little genuine disagreement between my account and Pakaslahti's.

INTRODUCTION

In a recent philosophical debate, two views related to betterness in sport competitions have arisen: my stance and that of Arvi Pakaslahti. I introduced the 'three-criteria'[1] model of athletic superiority (Hämäläinen, 2014). I also argued that this is a more fruitful stance compared to Nicholas Dixon's (1999) one-criterion view in Dixon's article *On Winning and Athletic Superiority*. Later, I further developed and improved my model (Hämäläinen, 2015). Pakaslahti (2016) criticised my model and offered two ideals to replace it: the Athletic Superiority Ideal and the Just Results Ideal.

The purpose of my model and Pakaslahti's model is the same: to analyse competitions that, for many people, arouse a feeling that the wrong athlete or team may have won. A typical instance of such a scenario is when the better team or athlete does not win.

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[1] Originally, I used the term standard instead of criterion, but the term criterion seems to be easier to grasp.

Pakaslahti agrees with me that refereeing errors, cheating, bad luck and gamesmanship, factors named by Dixon (1999), can cause competitions which failed to determine the better team or athlete in a specific competition. Let us look at Dixon's example of refereeing errors. The example is a football match in which the away team is dominating the match. It is constantly on attack and scores three good goals. However, the referee disallows all of them because he thought they were offside (although they were not). In addition, the referee erroneously awards a penalty to the home team. The home team scores and wins the match 1–0 (Dixon, 1999, p. 11).

Pakaslahti apparently agrees with me that a wrong team may have won in Dixon's example. However, our analyses of the situation seem to differ. I explain this case – and other situations where the better team or athlete may not have won – by referring to a conflict between the three criteria of my model. Pakaslahti, on the other hand, proposes that either the Athletic Superiority Ideal or the Just Results Ideal (or both, as in Dixon's example[2]) were not met in this kind of case.

The purpose of this paper is to demonstrate that, despite initial disagreement, my view and Pakaslahti's view are very close to each other. I begin by introducing and elaborating my model. I also describe what kind of details or nuances Pakaslahti's article adds to it. Then, I introduce Pakaslahti's explanation and discuss how my basic idea is reborn in Pakaslahti's explanation. I conclude that a feeling about wrong winner can be explained by referring to conflicting items.

The 'three criteria'

I argue that betterness refers to the hierarchical order of units that we are considering. In sport, these units are athletes or teams, and there are three criteria (or standards) to establish their order (Hämäläinen, 2014, p. 291; Hämäläinen, 2015, p. 15). As Pakaslahti notes, I have not sustained a fixed terminology for these criteria. Originally, I introduced the terms (1) the achievement of a better formal result than one's opponent, (2) the superior ability to meet prelusory goals using lusory means and (3) the demonstration of superior athletic skill (Hämäläinen, 2014, p. 291). Later, I used the terms (1) official result, (2) ideally adjudicated result and (3) display of athletic skills (Hämäläinen, 2015, pp. 15–19). I will mainly use the latter terminology for the criteria in this paper. Pakaslahti however, prefers my original terminology because he regards them as more plausible (Pakaslahti, 2016, p. 292, note 11). I will address Pakaslahti's concern about the terminology when I elaborate the criteria of an ideally adjudicated result.

Official result

An official result of a sport competition is a number accompanied by a unit of measurement: *9.58 seconds*, for example, is an official result (Hämäläinen, 2014, p. 292; 2015, p. 17). Sport officials and organisations control official results and assign them to athletic performances. In the men's 100-metre final in the 2009 Berlin World Championships,

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[2] Pakaslahti does not analyse Dixon's example in his article. Therefore, this suggestion is my interpretation how to use Pakaslahti's explanation to analyse Dixon's example.

Usain Bolt's official result was *9.58 seconds*. In theoretical terms, the official result expresses how many units of a related quality the officials of the sport attributed to an athletic performance. For example, the unit *second*, in the official result of *9.58 seconds*, is related to the quality *time*. Thus, Bolt's official result of 9.58 seconds implicates that the sport officials attributed 9.58 seconds of time to his athletic performance.

Ideally-adjudicated result split into two criteria

An ideally adjudicated result is a number accompanied by the unit of measurement, like the official result (Hämäläinen, 2015, pp. 17–18). However, an ideally adjudicated result differs from the official result in the sense that the ideally adjudicated result expresses how many units of a related quality the officials of the sport *should have attributed* to athletic performance according to the rules of the sport. For example, consider the three goals that the referee erroneously disallowed from the away football team in Dixon's example. The official result of the away team is thus 0 goals, but its ideally adjudicated result should be 3 goals.

Pakaslahti proposes that there is a substantial difference between my earlier term, 'meeting a prelusory goal by lusory means', and the new term, 'ideally adjudicated result' (Pakaslahti, 2016, p. 292, note 10). In other words, the difference is not merely terminological, but also concerns the content. Pakaslahti does not identify the difference but he is right that there is a difference. Let us first look at how I define the original term. Roughly, the criteria of meeting a prelusory goal using lusory means refers to achieving a specific state of affairs by using only those means that are allowed by the rules (Hämäläinen, 2014, pp. 291–292; Hämäläinen, 2015, pp. 15–18; see also Suits, 2010, pp. 25–26, p. 28). For instance, in a 5,000-metre race, running the distance of 5,000 metres faster than other competitors is the specific state of affairs. The means allowed by the rules say, amongst other things, that you should try to be faster than others without tripping any participants.

It seems that an *ideally adjudicated result* refers to *a number* accompanied by the unit of measurement, but *meeting a prelusory goal by lusory means* refers to *a comparison* between the numbers.[3] For instance, the away team's *ideally adjudicated result* in Dixon's example is *3 goals*. Instead, saying that the away team *met the prelusory goal by using lusory means* refers to *the comparison* that the away team would have had more goals than the home team according to a correct application of the rule.

By introducing the new term, 'ideally adjudicated result', I made the three criteria of betterness more uniform, because the two other criteria also express a number or value. The new term is also easier to understand. Pakaslahti, however, is not satisfied with the new term. He writes that the criterion of ideally adjudicated result faces certain problems that the criterion 'meeting a prelusory goal by lusory means' does not have (Pakaslahti, 2016, p. 292, note 10).

Pakaslahti argues that the criterion of ideally adjudicated result does not take into account the ethos of the sport (Pakaslahti, 2016, pp. 288–290). This criticism is based on the distinction between two kinds of sport rules: written rules and ethos rules (see

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[3] An alternative interpretation would be that *meeting prelusory goal by lusory means* focuses on the process by which the number was generated.

D'Agostino, 1981). Written rules are found in the rulebook and they are governed by some organisation and its procedures. One can learn written rules by reading the rule book. Ethos rules, instead, are a shared agreement, convention or practice about what is permissible and impermissible in the sport. Learning ethos rules often involves participating in the particular sport practice or following it closely.[4]

The written rules and ethos rules greatly overlap but may also have some differences. The ethos rules typically include numerous written rules and perhaps some additional rules not mentioned in the rulebook. For instance, the ethos rules of football include the 'help for the injured player' rule, or the 'voluntary suspension of play' (VSP), as referred to in the philosophical literature earlier (see Hardman, 2009; Mumford, 2010). The written rules do not identify a VSP rule. According to the VSP, a football player should kick the ball out of play if there is an injured player on the field. The game action is suspended when the ball goes out of play and medical personnel can come to treat the injured player. The play continues with a throw-in by the team that did not kick the ball out. However, after the throw-in, the throwing team should return the ball to the team that kicked the ball out (see Pakaslahti, 2016, pp. 288–290; Simon, 2014).

Pakaslahti describes a football match in which two players from Team A, Player Q and Player R, exploit the disparity between written rules and ethos rules. Team B is attacking at the very end of the game, when a Player P of team A is injured. Consequently, a player from team B kicks the ball out of play. After the injured player is treated, however, team A does not return the ball to team B: Player Q throws the ball to his teammate R, who breaks through the defence of team B and scores (Pakaslahti, 2016, p. 285, p. 289; see also Simon, 2014)[5]. I assume that no other goals were scored in that match.

The official result of team A is 1 goal, but what is the ideally adjudicated result? In other words, how many goals should be attributed to team A, according to the rules of the sport? According to the written rules, the ideally adjudicated result is 1 goal. In contrast, according to the ethos rules, the ideally adjudicated result is 0 goals. Pakaslahti (2016, pp. 288–290) assumes that I refer to the written rules. His interpretation could be supported by stating that referees should usually ground their decisions on written rules, not on ethos rules. Therefore, it seems that an ideally adjudicated result cannot be based on ethos rules. If Pakaslahti's interpretation is right, my model seems to miss the ethos aspect of sports.

There are two possible ways to answer to Pakaslahti's critique.[6] The first way is to rename the ideally adjudicated result and revise the description of this criterion so that both understandings of the rules are possible. We could speak about a 'rule-based result' instead of an ideally adjudicated result. The rule-based result refers to the number accompanied by the unit of measurement and tells us which number, accompanied by unit of measurement, should reside with athletic performance according to the rules of the sport. If rules are understood as written rules, my model lacks the ability to

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[4] I am not strictly following D'Agostino's (1981) definition of ethos of games. I am rather trying to express the idea of the ethos of sport in structural, mechanical or systematic way.

[5] Pakaslahti has three variations of football matches. Here, I refer to (what he calls) the Tight Football Match III.

[6] Both of these solutions face certain problems, but I will not address the problems in this paper. Furthermore, these problems are not specific for my account, but concern also Pakaslahti's model.

directly explain what disturbs us when somebody breaks the ethos rules. But if rules are understood as ethos rules, then my model can directly capture the cases where ethos rules are violated.

The second way to answer to Pakaslahti's critique is to split the criteria of ideally adjudicated result into two criteria; one criterion comprises the result according to the written rules and the other refers to the result according to ethos rules. We can call these new criteria: 'written-rules-based result' and 'ethos-rules-based result'. The result based on written rules is a number accompanied by the unit of measurement. It tells us which number accompanied by the unit of measurement should reside with athletic performance according to the written rules of the sport. In Pakaslahti's example of the football match, the written-rules-based result is 1. The second part of the division, the result based on ethos rules, yields an ethos-rules-based result of 0 goals.

If we value simplicity, we should prefer the first option, that is, to continue using three criteria of betterness, since written rules and ethos rules seem to conflict rarely. However, this paper focuses on the nuances and details of sport competitions, not on simplicity. Therefore, I explore the consequences of choosing the latter option, splitting the criterion into two. This choice increases the total amount of my criteria to four. Next, I will introduce my last remaining criterion of betterness.

Display of athletic skills

'Display of athletic skills' refers to how much some particular athletic performance includes action elements that the sport community values (Hämäläinen, 2014, 2015). For instance, let us compare two different kinds of goals in football: a goal scored from a penalty shootout and Argentinian Maradona's second goal against England in the 1986 World Cup match. Maradona received the ball in Argentina's half. He dribbled around Englishmen all the way to England's goal and scored. Maradona's goal embodies actions that the football community values more than actions that are required to score a goal from a penalty shot.

Congruence between the criteria of betterness

I hold that a sport competition determined the better team or athlete in that competition if there was congruence between the three criteria (Hämäläinen, 2014, p. 290; 2015, p. 19). Respectively, the competition failed to determine the better athlete or team if there was a conflict between any of the criteria. After splitting the ideally adjudicated result into two criteria, the requirement for determining the better team or athlete has risen to congruence between the four criteria. To illustrate a competition that failed to determine the better team, we can consider Dixon's example of refereeing errors. The home team achieved a better official result (1 goal). However, the away team achieved the better written-rules-based result (3 goals), the better ethos-rules-based result (3 goals) and displayed more athletic skills (it was dominating and attacking dangerously). Thus, the official result conflicted with all the other criteria, and the competition failed to determine the better team in that match.

Pakaslahti: two ideals

According to Pakaslahti (2016, pp. 281–282), there are two built-in ideals or goals for every sport competition: the Athletic Superiority Ideal and the Just Results Ideal.

Athletic Superiority Ideal

Pakaslahti (2016, pp. 281–282) states that the Athletic Superiority Ideal is met if the competition provides an official result which reflects accurately the betterness of different athletes or teams in that contest. For instance, if A beat B in a sport contest, even though B was better, the Athletic Superiority Ideal is not met. According to Pakaslahti, betterness is connected to athletic excellence, which he considers as 'the correct criterion of betterness in sport' (Pakaslahti, 2016, pp. 289–290). Thus, if B was better than A in a sport competition, then B demonstrated athletic excellence over A.

Pakaslahti proposes that athletic excellence is a broader notion than athletic skills. Athletic excellence is about athletic abilities, not merely about athletic skills. He describes a boxing match between Boxer A, who 'demonstrates superior technique, speed and agility' and the opponent, Boxer B, 'who is much bigger and has a much longer reach than Boxer A'. Boxer B wins the match easily. Pakaslahti suggests that Boxer A displayed more athletic skills whereas Boxer B demonstrated more athletic abilities as a whole (Pakaslahti, 2016, pp. 289–290). However, there is a problem in Pakaslahti's explanation of athletic abilities.

It seems that athletic skills defined by me and athletic excellence introduced by Pakaslahti refer to the same phenomenon. Let us look more closely at the example of the boxing match. If athletic abilities were determined only by Boxer B's bigger size and longer reach, the boxing match between them would appear to be futile. We could simply view their physical attributes and say that Boxer B is better than Boxer A, without having a match between them. Even supposing Boxer A managed to beat Boxer B, Boxer B would still be deemed as better than Boxer A according to this view. Obviously, Pakaslahti does not support this kind of view. It seems that Pakaslahti intended to suggest that Boxer B demonstrated more athletic excellence because Boxer B was stronger and absorbed the hits of his opponent, which was due to Boxer B's physical attributes, size and reach. Seemingly, hitting powerfully and blocking punches are actions that the boxing community values. Remember, I define athletic skills as actions that the sport community values. Thus, Pakaslahti's view of athletic excellence resonates with my view of athletic skills.[7]

The final note about the boxing match addresses a possible concern about conflicts in athletic skills. Some people may think that it was Boxer A who showed more athletic skills, not Boxer B as Pakaslahti claims. This kind of disagreement is not a threat for my view of athletic skills because I state that display of athletic skills depends on the valuations of the sport community, and among that community, different people may value the

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[7] Pakaslahti could have argued that my term athletic skills does not correspond to my definition of athletic skills and that I should use a more accurate term, namely athletic excellence. This is a more plausible argument than Pakaslahti's attempt to separate athletic skills defined by me from athletic abilities described by him.

same actions to different degrees (see Hämäläinen, 2015, pp. 28–29). Some may value more agility and technique while some may value more strength. In other words, my criteria of athletic skills seem to capture the plurality of the real world.

It seems that the Athletic Superiority Ideal is a truncated version of my multiple-criterion model. The Athletic Superiority Ideal detaches two criteria from my model, official result and display of athletic skills, and proposes that we need congruence between these two criteria to determine betterness. Diagram 1 illustrates this connection between my criteria of betterness and Pakaslahti's Athletic Superiority Ideal.
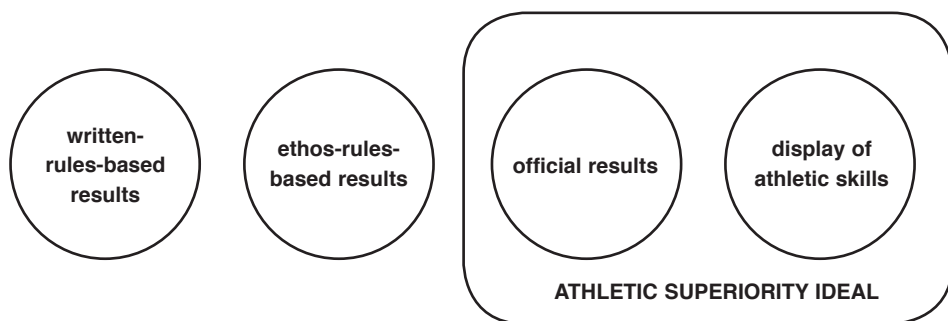
Diagram 1. The relation between my criteria of betterness in sport and Pakaslahti's Athletic Superiority Ideal

Just Results Ideal

According to Pakaslahti (2016, pp. 282–283), the Just Results Ideal was achieved if the winner of the contest deserved the victory. Victory was deserved if it was determined by the rules and ethos of the sport: 'I believe that whether some athlete or team deserved (or would have deserved) to win some sports contest is not always determined only by the rules of that contest. I think it is also determined by the ethos of the sport the contest represents' (Pakaslahti, 2016, p. 288).

Pakaslahti describes a case in which the Just Results Ideal was not achieved: a football match between Team A and Team B. The match is tight. Both teams possess the ball 50 per cent of the time, have two corner kicks, and have two shots saved by their goalkeepers. However, there is one notable difference between their performances. Team A creates five good scoring opportunities in which the ball misses the goal by only half a metre while team B has two good scoring opportunities in which the shot goes four metres wide. The match is free of bad luck, refereeing errors, cheating or gamesmanship. In the last moments of the game, however, two players of Team A exploit the disparity between the written rules and ethos rules of football, as described earlier in this paper. The match is about to end soon and team B is attacking, when Player P from Team A gets injured. Consequently, a player of Team B kicks the ball out of the field according to the ethos rule, the voluntary suspension of play. However, after the throw in, Team A does not return the ball to Team B, but scores a goal and thus violates ethos

rules. The Team A wins the match 1–0 because of this goal (Pakaslahti, 2016, p. 285, pp. 288–289)[8].

Pakaslahti states that the Just Results Ideal was not achieved in his example due to the violation of the ethos rules by team A: 'Team A did not deserve to win because […] they [two players of team A] violated a convention which is a fundamental part of the ethos of football' (Pakaslahti, 2016, p. 289).

Pakaslahti (2016, p. 289) argues that the three-criterion model of athletic superiority cannot explain why the football match would be a failed athletic contest. He is right if the rules of sport are interpreted as written rules. However, the more nuanced version, the four criteria account, is able to explain Pakaslahti's example by referring to a conflict between the criteria. Team A achieved the better official result (1 goal), the better written-rules-based result (1 goal) and displayed more athletic skills (it had better scoring opportunities). However, both teams achieved the same ethos-rules-based result (0 goals).

The Just Results Ideal appears to be a truncated version of the four-criterion account. The just result ideal detaches the official result, written-rules-based result and ethos-rules-based result and compares the three to see whether there is a conflict between them. Furthermore, when the written rules and the ethos rules are congruent, or their disparities do not cause decisive problems, the Just Results Ideal also represents the truncated version of the three-criterion model. Diagram 2 illustrates the connection between the criteria of betterness and the Just Results Ideal:
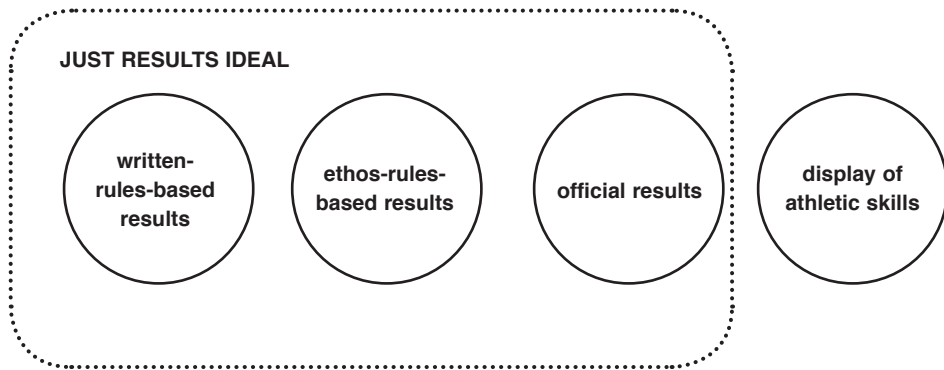
Diagram 2. Relation between my criteria of betterness in sport and Pakaslahti's Just Results Ideal

CONCLUSION

I have analysed two different points of view related to betterness in sport competitions: my three criteria of betterness in sport and Arvi Pakaslahti's two built-in ideals.

My view is comprised of three criteria: official result, ideally adjudicated result and display of athletic skills. On the basis of Pakaslahti's critique, I have argued that, if our

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[8] I refer again to Pakaslahti's Tight Football Match III.

goal is to explain the details and nuances of betterness in sport competitions, the ideally adjudicated result should be split into two criteria: written-rules-based result and into ethos-rules-based result. Consequently, the total number of criteria would rise to four. According to my multiple-criterion model, sport competition determines the better team or athlete if the criteria are congruous.

The two built-in ideals introduced by Pakaslahti are the Athletic Superiority Ideal and the Just Results Ideal. The Athletic Superiority Ideal claims that the better athlete or team was determined if the official result accurately reflected the relative betterness, that is athletic excellence, of the athletes or teams in that contest. The Athletic Superiority Ideal can be also expressed in my terminology: the better athlete or team was determined if the criteria of official result and athletic skills were congruous. Pakaslahti's second ideal, the Just Results Ideal, states that the team or player deserved victory if it was determined by the rules and ethos of the sport. Again, the Just Results Ideal can be expressed in my terminology: victory was deserved if the official result, written-rules-based result and ethos-rules-based result were congruous.

It seems that the two accounts, the four criteria of betterness and the two ideals, share the same underlying idea. They both test congruence for four items. I test congruity at once between the four items whereas Pakaslahti divides the testing into two segments. The item of official result is involved in both of these segments. Diagram 3 illustrates the underlying idea of the four shared items in my and Pakaslahti's views. Furthermore, when the written rules and ethos rules do not conflict decisively, the three-criterion version of betterness and the two built-in ideals share the same underlying idea.
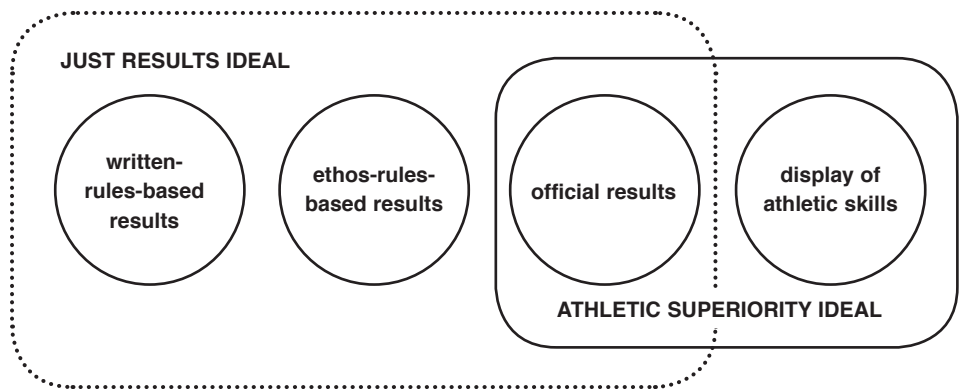
Diagram 3. Connections of my criteria of betterness in sport and Pakaslahti's two built-in ideals

The difference between my approach and Pakaslahti's approach to the four items appears to be partly caused by different terminological understanding. I understand betterness through all the four items. For Pakaslahti, betterness is only about two items: official result and athletic skills (or athletic excellence). Furthermore, Pakaslahti thinks that official result together with written-rules-based result and ethos-rules-based result are related to justness or deservingness (Pakaslahti, 2016, pp. 281–283, pp. 289–290).

To illustrate the conclusion about the items that may conflict, let us return to Dixon's example about the football match. In that match, the home team won 1–0, since

the referee erroneously disallowed three good goals from the away team and contributed to the home team's only goal by making a bad call. It follows that official result conflicted with other criteria (result based on written rules, result based on ethos rules and display of athletic skills). Pakaslahti accepts the conflict, but chops it into two parts (when expressed with my terminology). First, the official result conflicted with display of athletic skills. Second, the official result conflicted with result based on written rules and result based on ethos rules. Thus, there seems to be a considerable amount of agreement between me and Pakaslahti on the underlying level.

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THE PSYCHOMETRIC PROPERTIES OF THE STRENGTHS AND DIFFICULTIES QUESTIONNAIRE IN A MULTI-ETHNIC SAMPLE OF YOUNG CHILDREN

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ABSTRACT

Objectives: Developed countries are becoming more multi-ethnic, with consequent problems of maintaining invariance of health questionnaires. We aimed to explore commonalities in the structure of the Strengths and Difficulties Questionnaire (SDQ) completed for young children in a multi-ethnic English cohort while examining potential method effects and misfitting items. The secondary aim was to demonstrate the usefulness of bifactor modelling and exploratory structural equation modelling (ESEM) for kinanthropological research.

Methods: We used SDQ data from 3,290 children enrolled in the Born in Bradford cohort, completed by parents (usually the mother) at child age 3 and 4 and teachers at age 5. The factor structure for 11 potential configurations was assessed in each age group using confirmatory factor analysis. ESEM was used to assess misfitting items under the best fitting configuration.

Results: The best fitting configuration was a bifactor model of the 2 broader scales and a methods factor, using the 20 difficulties items. Generally, factor loadings increased between age 3 and age 5. Several items contributed to misfit.

Conclusions: There was less support for the robustness and hypothesised structure of the SDQ in this sample. Bifactor scores that account for measurement error could be useful if carefully applied in epidemiological and kinanthropological studies in multi-ethnic and/or younger age samples.

Keywords: Strength and Difficulties Questionnaire; factor analysis; exploratory structural equation modeling

The Strengths and Difficulties Questionnaire (SDQ) is a 25-item instrument used to screen for behavioural problems and is widely used as an indicator of psychopathological risk in general population surveys of children (Goodman, 1997). Its focus makes it attractive also for kinanthropological research, especially to explore associations between psychopathology signs in childhood and levels of physical activity either at young age (Hamer et al., 2009) or adolescence (Sagatun et al., 2007; Ussher et al., 2007). The SDQ has also been successfully used in a more specific kinanthropological context, for example, to measure associations between emotional problems and physical activity (Wiles et al., 2008) or to explore effects of television viewing on psychological health with physical activity as a covariate (Page et al., 2010). Finally, the SDQ was recently applied in the context of physiopathology such as low back pain (Watson et al., 2003), asthma (Glazebrook et al., 2006), cerebral palsy (Majnemer et al., 2008), sleep problems (Nixon et al., 2008), and other physical or neurological disabilities (Law et al., 2007).

There are several versions of the SDQ intended to be used to assess children age 4–17 which are formatted and worded to be completed by parents and by teachers (termed the SDQ^{4-17}), and a self-rated version for children age 11–17. More recently, the SDQ has been applied in samples of younger children. Early-years (child age 2–4) versions have been developed for teachers and parents (the SDQ^{2-4}). In these versions the developers have altered the wording of three questions.

For all SDQ versions, each item requires a response on scales that display three response options (that the described behaviour is Not True, Somewhat True or Certainly True), so that ratings can characterise three levels of strengths or difficulties. Twenty of the 25 questions describe aspects of problem behaviour. These problem behaviour items can be grouped into four (5-item) subscales representing 1) emotional, 2) peer, 3) behavioural and 4) conduct domains. Morbidity (problems) are indicated by higher scores. The four subscales can also be clustered into two 10-item broader scales with the emotional and peer subscales indicating internalising problems, and the hyperactivity and conduct subscale indicating externalising problems (Figure 1). The broader subscales have been suggested for use in community, rather than clinical, samples (Goodman et al., 2010a). Together, all 20 are used to provide a summary score for 'total difficulties' (Figure 1). Five of these 20 questions are positively worded, but with scoring reversed to reflect difficulties. These are shaded in Figure 1 and labelled 'methods'. The five remaining questions make up the prosocial subscale. Prosocial items are positively worded questions designed to indicate strengths rather than difficulties. This subscale is not usually included when assessing difficulties.

The risk of psychopathology can be estimated in a variety of ways using thresholds based on the summary score of total difficulties (20 questions), the two broader scales (2 × 10 questions), or the four subscales (4 × 5 questions). Mean score differences between groups for the broader scales or total difficulties score can also be estimated. Internal consistency for the subscales is satisfactory and higher for teacher rated scoring (weighted mean subscale score range 0.63 to 0.83 for N = 26 studies) than parent rated (range 0.53 to 0.76) with higher internal consistency for the total difficulties score (teacher rated 0.82, parent rated 0.80) (Stone et al., 2010). Consistently, and regardless

of rater, the peer subscale appears to be the least reliable. Test-retest reliability is also stronger for teacher rated scores (weighted mean correlation subscale score range 0.72 to 0.85 for N = 6 studies, total difficulties 0.84) than parent rated (subscale range 0.65 to 0.71, total difficulties 0.76) (Stone et al., 2010).

The SDQ can also be used to predict disorder (unlikely, possible, probable) from studies that have ratings from at least two different informants, for example from parents and teachers (Goodman et al., 2000b). The predictive algorithm utilises information from the multiple ratings on the subscales that indicate hyperactivity problems, conduct problems and emotional behaviour and the questions at the end of the SDQ that form an impact statement about the effect of the child's difficulties (Goodman et al., 2000b). The sensitivity of the algorithm to detect any psychiatric disorder via multi-informants in an English speaking sample of 5–15 year olds was 63.3%, with specific disorder sensitivity ranging from 50.1% (any anxiety disorder) to 86.1% (any hypokinetic disorder) (Goodman et al., 2000a). There was a high number of false positives in this community sample; 47.3% of children with a 'disorder probable' SDQ prediction did not have a psychiatric disorder, and misclassification errors are twice as likely using data from just one informant.
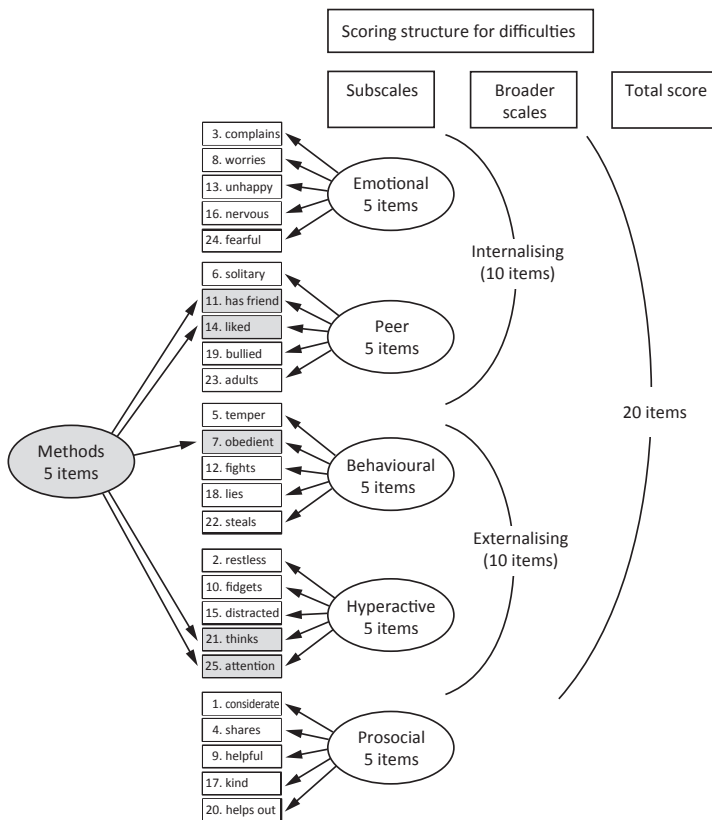
Figure 1. Component items of the Strengths and Difficulties Questionnaire and scoring structure

The SDQ[4–17] is the original scale and numerous studies have aimed to explore or confirm its hypothesised structure. A 2010 review found eight studies reporting confirmatory factor analyses (CFA), with some, but not universal, support found for structures represented by all five subscales, and the two broader scales plus the prosocial subscale (Stone et al., 2010). Some studies have reported an effect of the five positively worded difficulties questions (methods items) on the structure (McCrory & Layte, 2012; van de Looij-Jansen et al., 2011).

The SDQ[2–4] has only more recently been suggested as a behavioural questionnaire for initial risk assessment i.e. a screening instrument, and fewer modelling studies have been conducted in samples within this younger age range. A recently reported CFA of the parent administered SDQ at age 3 in a UK-representative sample found more support for a five than a three or one subscale structure (Croft et al., 2015). In contrast, CFA studies in Spanish and Dutch samples reported less than satisfactory baseline fit for the five subscales, a unidimensional structure of all 25-items, and a second order structure of the five subscales within the two broad subscales (Ezpeleta et al., 2013; Theunissen et al., 2013). As with analyses of the SDQ[4–17], the tested structures included items from the prosocial subscale even though this subscale is not typically included when scoring the instrument. Croft et al. (2015) studied invariance over time (age 3, 5 and 7), finding support for strong invariance for the conduct and hyperactivity subscales and metric invariance for the peer and emotional subscales. Presently – in this age range – there are few other correlation and descriptive studies, (e.g. Fuchs et al., 2013; Petermann et al., 2010).

The SDQ has, at the time of writing, been translated into 79 languages, and there are many studies reporting validity of translated versions. A potential problem of validity arises when several sub-populations, such as those indicated by different language, or ethnic group, are present in a sample, or when several samples with some language or cultural variation need to be compared. Robustness of inferences in populations with such sub-population variation are typically empirically investigated using differential item functioning (DIF) methodology (Gregorich, 2006). Findings from two cross national studies including children from a range of ages suggest that the SDQ cannot be assumed to have the same factorial structure or relationship with diagnoses of disorder across countries (Goodman et al., 2012; Stevanovic et al., 2014). Some studies have assessed potential measurement differences arising from cultural and language variation within countries in younger age samples. Two CFA studies in samples that included children age 4 or 5 have examined DIF by ethnicity using both teacher and parent rated SDQ[4–17]. A UK study with only English versions of the SDQ found invariance between White and Indian sub-samples (Goodman et al., 2010b). A North American study also reported invariance between American English and Spanish language samples, however the baseline fit for each group, required to test invariance, were only marginally adequate (Hill & Hughes, 2007). A third study employing principal components analysis using data from younger children (mean age 5.3) across five ethnic groups in the Netherlands found evidence of DIF (Mieloo et al., 2014).

The implications for lack of invariance are clear; groups within samples cannot be compared with any accuracy and attempts to do so could lead to spurious conclusions regarding the difficulties of a particular ethnic group. Taking a forward view, as developed countries become more multi-ethnic there will be a growing need to validate instruments across increasingly diverse samples. Studies will include many ethnic groups,

with different sample sizes. This presents some difficulties. Foremost, any classification of a person into an 'ethnic group', is an artificially constructed analytical grouping of convenience that can mask important social and experienced variation (Nazroo, 1998). Factors such as cultural, racial and ethnic identity might vary in their interaction during the multidimensional process of acculturation, meaning that within-group variation could be greater than differences between-group, and these can change over time (Bhugra, 2005). Populations are dynamic and it may not be reasonable to assume homogeneity in the lived experience of persons of mixed and multi-ethnic heritage in particular; the fastest growing UK minority groups. Together with the technical difficulties that arise when assessing DIF in small sample sizes fragmented by attempts to classify 'homogeneous' groups, it is possible that a fresh approach towards multi-ethnicity in epidemiological studies is needed. If the relevant validity question were to be rephrased *what is common across a diverse sample, or between diverse samples?* Then it may be possible to find a valid structure that measures important dimensions of children's behaviour whilst also minimising measurement error and retaining already established validity claims.

In summary, despite the popularity of the SDQ, there is little work as yet describing the psychometric structure of the SDQ by the age of the child, and less research overall in multi-ethnic, younger age samples. The Born in Bradford (BiB) study administered the SDQ in three separate sub-studies at child age 3, 4, and 5, thus providing an ideal environment in which to examine commonalities in structure across variation in informants and age. We aimed to revisit the construct validity of the SDQ in light of recent research interest in examining risk of psychopathology and its association to physical activity in young children. Our secondary aim, though implicit, was to introduce bifactor modelling and exploratory structural equation modelling as well as demonstrate its usefulness for assessment of structural hypotheses and model misfit to wider kinanthropological community.

METHODS

Sample

In this analysis we used data collected in several Born in Bradford (BiB) sub-studies. Bradford is a city of around 500,000 inhabitants in the North of England with high levels of socio-economic deprivation and ethnic diversity, and BiB was set up to examine the impact of environmental, psychological and genetic factors on maternal and child health (Raynor and Born in Bradford Collaborative Group, 2008; Wright et al., 2013). Between 2007–2010 more than 12,000 women were recruited during pregnancy, of which 45% identified themselves as being of Pakistani origin, 39% White British and the remaining 6% of different and varying ethnicity. Three sub-studies have collected early SDQ data on BiB children:

1. At age 3, the Parent SDQ[2–4] was completed by the parent using computer-assisted personal interviewing (CAPI) for a study on childhood obesity (N = 1,217)
2. At age 4, parents filled in the Parent SDQ[4–17] via CAPI for a study on asthma (N = 1,711)
3. At age 5 the child's teacher filled in the Teacher SDQ[4–17] between March to July in 2013 and 2014 using a paper version of the SDQ (N = 2,365)

In all, there was at least one SDQ rating 3,920 children. Nominally, all three samples were broadly representative of children in the BiB study.

Scoring

Negatively worded difficulties items and the items in the prosocial scale were scored in each response category of Not True = 0, Sometimes True = 1 or Certainly True = 2. Scoring was reflected for responses to the five positively worded difficulties items.

Psychometric analysis

a) Confirmatory factor analysis

For each sample we tested 11 plausible structures that are typically examined (see Figure 2) in the SDQ using CFA under Full Information Maximum Likelihood (FIML; Enders and Bandalos, 2001) estimation[1]. In all three samples we noted fit indices of each configuration (Akaike Information Criterion (AIC; Akaike, 1973), Bayesian Information Criterion (BIC; Schwarz, 1978)). These relative fit indices allow for comparison of competing models (based on the same data but with varying numbers of parameters) since they penalize more complex models. The model with the lowest AIC and BIC is preferred.

Absolute model fit was assessed by means of Comparative Fit Index (CFI; Bentler, 1990), Root Mean Square Error of Approximation (RMSEA; Steiger and Lind, 1980) and Weighted Root Mean Square Residual (WRMR; Muthén and Muthén, 1998–2016a; Yu, 2002). CFI values larger than 0.95, RMSEA values lower than 0.06 and WRMR values around 1 are considered indicate model fit to data. More detailed recommendations on cut-off values for these fit indices can be found in Hu and Bentler (1999). To obtain this latter set of indices for assessment of absolute model fit, we re-estimated all models using mean and variance adjusted Weighted Least Squares (WLSMV; Muthén, 1993) as they are not provided when FIML is used.

For further assessment of model misfit, we used an Exploratory Structural Equation Modeling (ESEM) approach on the best-fitting configuration. Mplus version 7.3 (Muthén and Muthén, 1998–2016b) was used for all analyses.

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[1] A sandwich estimator was used to account for clustering of pupils by teacher in the age 5 sample.

Structure 1
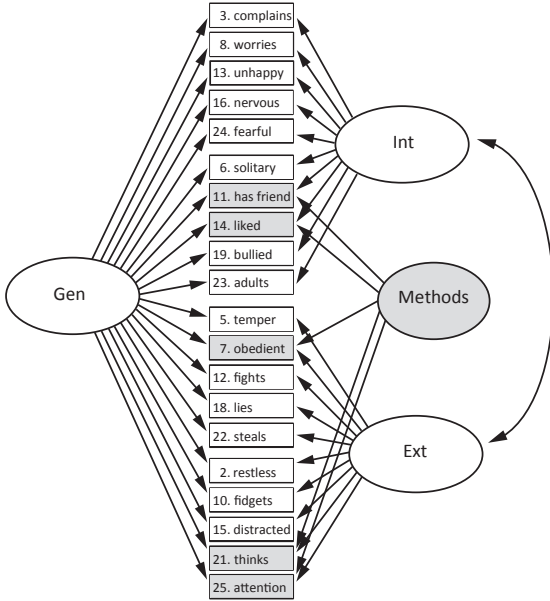
Structure 2
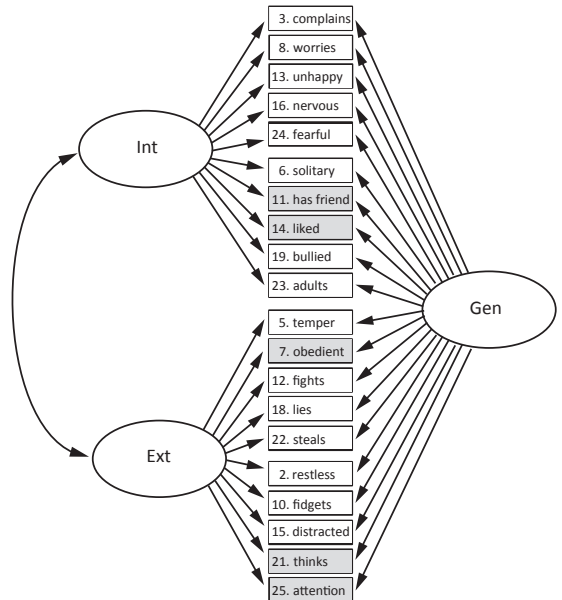
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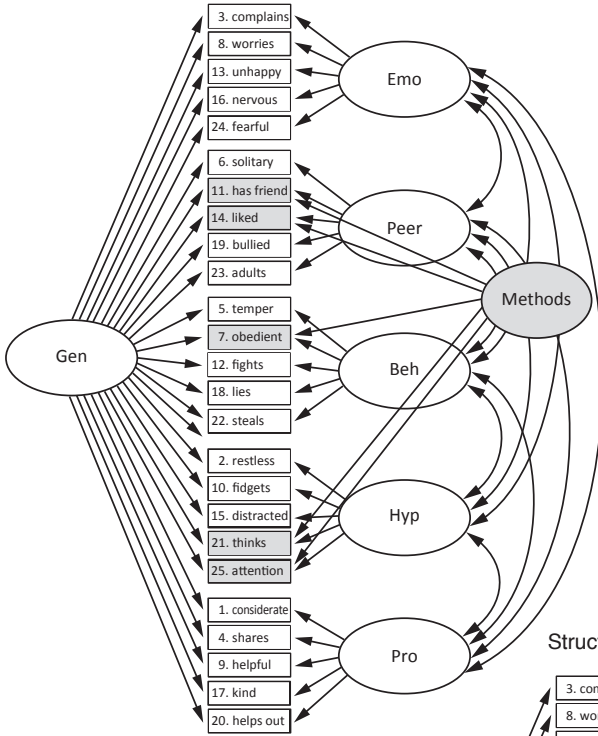
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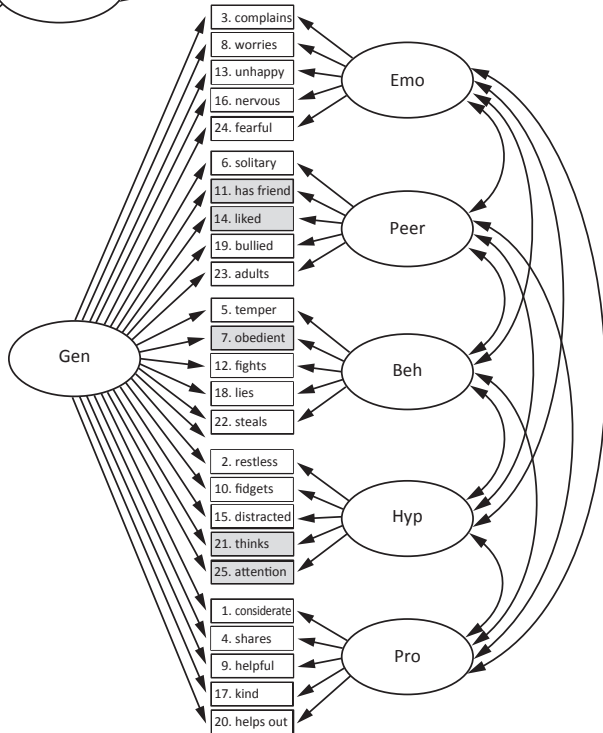
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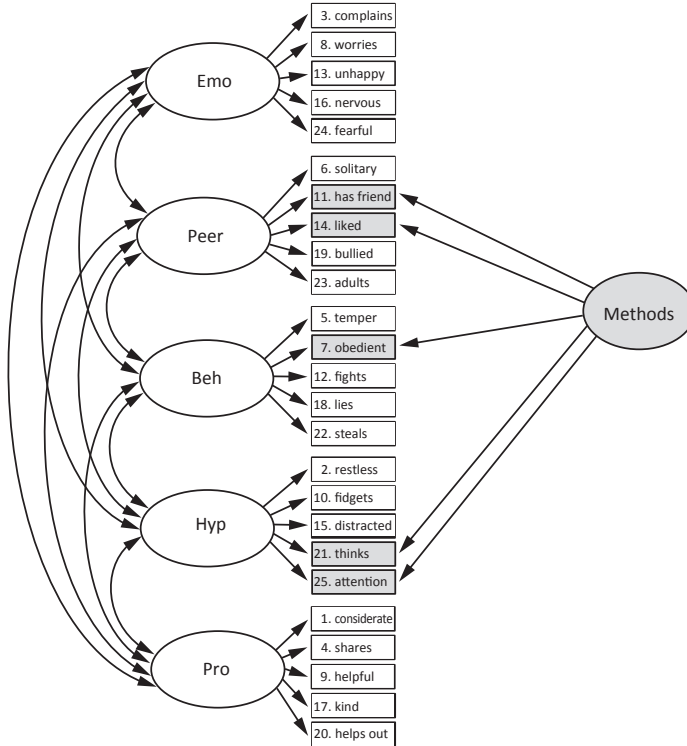
Structure 6
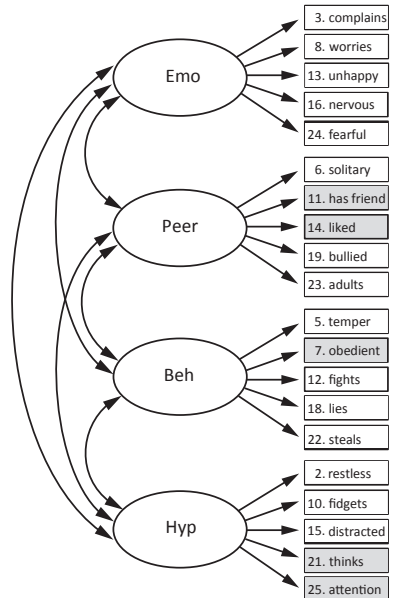
Structure 7

Structure 8

Structure 9

Int
- 3. complains
- 8. worries
- 13. unhappy
- 16. nervous
- 24. fearful
- 6. solitary
- 11. has friend
- 14. liked
- 19. bullied
- 23. adults

Ext
- 5. temper
- 7. obedient
- 12. fights
- 18. lies
- 22. steals
- 2. restless
- 10. fidgets
- 15. distracted
- 21. thinks
- 25. attention

Structure 10

Gen
- 3. complains
- 8. worries
- 13. unhappy
- 16. nervous
- 24. fearful
- 6. solitary
- 11. has friend
- 14. liked
- 19. bullied
- 23. adults
- 5. temper
- 7. obedient
- 12. fights
- 18. lies
- 22. steals
- 2. restless
- 10. fidgets
- 15. distracted
- 21. thinks
- 25. attention

Figure 2. Hypothesised SDQ structures. Illustrations are simplified path diagrams, where rectangles represent SDQ items, ovals represent latent variables/factors, arrows from ovals to rectangles represent estimated factor loadings (i.e. those not fixed to zero) and curves between ovals represent estimated factor correlations (i.e. those not fixed to zero). Error variances of items are not shown, but they were estimated in all models. Covariances between errors were fixed to zero in all models.

b) Exploratory Structural Equation Modelling (ESEM)

Traditional CFA allows items to load only on specified (target) factors. These factor loadings are then estimated where the remaining non-target loadings are set to be precisely zero. This might be relatively restricting as low (but non-zero) item loadings might be present in the model. If they are, but forced to be zero, the issue translates into poor model fit. To address this, ESEM methodology has been developed.

Algorithms implemented in ESEM perform target rotation (Browne, 2001) on the pre-specified structure (in our case structure (1) depicted in Figure 2) but allow items to also load on other factors. This approach helps to investigate non-negligible loadings of items on other than target factors and thus the source of model misfit.

Sample

Descriptives for each sample are presented in Table 1. Around half of the children were of Pakistani origin, which reflects the birth profile of the city of Bradford, and half were female. A similar ethnic profile was seen across all three samples. There was a high rate of SDQ completion, and 70–80% of the parent completed versions were in English.

Table 1. Descriptives of each sample

	Age 3	Age 4	Age 5
N	1217	1711	2365
SDQ version used	Parent [2–4]	Parent [4–17]	Teacher [4–17]
Child age in years, mean (SD) [range]	3.1 (0.07) [2.9 to 3.4]	4.6 (0.34) [4.0 to 5.2]	5.2 (0.3) [4.5 to 5.9]*
missing N	0	1	26
Language of SDQ, N (%)			
English	971 (79.8)	1181 (69.0)	2365 (100)
Punjabi/Mirpuri	7 (0.6)	27 (1.6)	0
Urdu	240 (19.7)	503 (29.4)	0
missing, N	0	0	0
Child is female, N (%)	631 (51.9)	856 (50.0)	1194 (51.0)
Ethnicity of mother, N (% non-missing)			
White British	460 (37.8)	502 (29.4)	689 (36.3)
Pakistani	596 (49.1)	1016 (59.5)	974 (51.3)
Other	159 (13.1)	189 (11.1)	234 (12.3)
missing, N	2	4	468
Ethnicity of child**			
White British	452 (37.2)	495 (29.0)	771 (32.6)
Pakistani	596 (49.0)	1016 (59.6)	1205 (51.0)
Other	168 (13.8)	195 (11.4)	386 (16.3)
missing, N	1	2	3
All 25 SDQ items complete, N (%)	1212 (99.6)	1708 (99.9)	2304 (97.4)
Teachers, N	–	–	186
cases missing the teacher	–	–	3

Samples overlap. *two 6 year old children were removed from the dataset; **where school data are missing, child ethnicity is backfilled by the mothers' and may under-represent the number of 'other' ethnicity due to unknown mixed race

Confirmatory factor analysis (CFA)

The configuration with the most support for good fit was structure (1) in Figure 2 comprising a bifactor model of the 2 broader scales and a methods factor, using 20 items. The bifactor model accounts for common variance in all items and three specific factors. Two specific factors account for specific common variance within internalising and externalising items respectively. The third specific factor (methods factor) accounts for the five positively worded items. Importantly, our results suggest this model remains the most promising one across our three samples (Table 2).

Table 2. Fit indices of factor models

Configuration	Age of sample	n	FIML			WLSMV		
			AIC	BIC	aBIC	CFI	RMSEA	WRMR
(1) Bifactor: 2 Broader scales and Methods (20 items)	**3**	**1214**	**38818**	**39231**	**38974**	**0.967**	**0.036**	**1.280**
	4	**1709**	**49790**	**50231**	**49973**	**0.971**	**0.037**	**1.452**
	5	**2361**	**44027**	**44494**	**44236**	*	*	*
(2) Bifactor: 2 Broader scales (20 items)	3	1214	38863	39276	39019	0.952	0.043	1.455
	4	1709	49829	50270	50013	0.967	0.039	1.529
	5	2361	44076	44544	44286	0.989	0.055	2.286
(3) Bifactor: 5 Subscales and Methods (25 items)	3	1214	48007	48523	48202	*	*	*
	4	1709	60378	60927	60607	0.877	0.072	2.623
	5	2361	57105	57687	57366	0.988	0.060	2.54
(4) Bifactor: 5 Subscales (25 items)	3	1214	48078	48588	48271	0.879	0.067	2.153
	4	1709	60627	61171	60853	0.864	0.075	2.742
	5	2361	57104	57681	57363	0.987	0.060	2.566
(5) 5 Subscales and Methods (25 items)	3	1214	*	*	*	0.870	0.068	2.227
	4	1709	*	*	*	0.864	0.073	2.751
	5	2361	57938	58440	58164	*	*	*
(6) 4 difficulties Subscales (20 items)	3	1214	39007	39344	39134	0.918	0.054	1.798
	4	1709	50365	50725	50515	0.892	0.068	2.513
	5	2361	44160	44541	44331	0.983	0.066	2.809
(7) Second order (25 items)	3	1214	48224	48647	48384	0.857	0.071	2.320
	4	1709	60917	61368	61105	0.845	0.077	2.921
	5	2361	58133	58612	58348	*	*	*
(8) 2 Broader scales and Prosocial subscale (25 items)	3	1214	48357	48755	48507	0.839	0.074	2.446
	4	1709	61091	61515	61268	0.827	0.081	3.076
	5	2361	59694	60144	59896	*	*	*
(9) 2 Broader scales (20 items)	3	1214	39126	39437	39243	0.898	0.059	1.961
	4	1709	50537	50869	50676	0.872	0.073	2.714
	5	2361	45580	45932	45738	0.950	0.110	4.605

			FIML			WLSMV		
Configuration	Age of sample	n	AIC	BIC	aBIC	CFI	RMSEA	WRMR
(10) Unidimensional difficulties (20 items)	3	1214	39306	39612	39422	0.868	0.067	2.184
	4	1709	50928	51255	51064	0.835	0.082	3.049
	5	2361	47425	47771	47580	0.895	0.159	6.638
(11) Unidimensional (25 items)	3	1214	48956	49339	49100	0.779	0.087	2.818
	4	1709	61971	62380	62141	0.771	0.092	3.499
	5	2361	62050	62483	62244	0.923	0.141	6.043

Broader scales; Internalising and Externalising (10 items each); Subscales, emotional symptoms, peer problems, hyperactivity, conduct problems, prosocial (5 items each); bolded rows indicate the configuration with the best fit; FIML estimated using Full Information Maximum Likelihood; WLSMV estimated under Weighted Root Mean Square Residual
*Model has not converged

Factor loadings in Table 3 show how closely items are related to hypothesised factors in our best fitting model across all three samples. The loadings on factors tend to increase over time (age 3 to age 5) suggesting the SDQ becomes more structurally clear and thus more valid for older children. In addition, with the exception of the age 5 sample, items with different wording (methods items) show very low factor loadings on the general factor which can be interpreted as their differential wording substantially affecting their validity. Further, relatively low factor loadings on methods factors for the age 3 and age 4 samples show that most of the item variance is explained by the general factor. Finally, the age 5 sample shows high factor loadings on the externalising factor and low loadings on the internalising factor which suggest that the general factor interprets internalising problems.

Table 3. Standardised factor loadings of the best fitting model across three samples

Item	Subscale	General			Internalising			Externalising			Methods		
		age 3	age 4	age 5	age 3	age 4	age 5	age 3	age 4	age 5	age 3	age 4	age 5
Q03 complains	emo	0.545	0.623	0.163	0.038	–0.126	0.434	–	–	–	–	–	–
Q08 worries	emo	0.529	0.654	0.311	0.376	0.150	0.801	–	–	–	–	–	–
Q13 unhappy	emo	0.595	0.809	0.361	0.308	0.074	0.688	–	–	–	–	–	–
Q16 nervous	emo	0.248	0.263	0.349	0.270	0.287	0.726	–	–	–	–	–	–
Q24 fearful	emo	0.269	0.556	0.421	0.334	0.137	0.831	–	–	–	–	–	–
Q06 solitary	peer	0.177	0.248	0.791	0.476	0.538	0.167	–	–	–	–	–	–
Q11 has friend (M)	peer	0.066	–0.062	0.907	0.159	0.553	–0.061	–	–	–	0.463	0.446	0.237
Q14 liked (M)	peer	0.161	0.136	0.677	0.230	0.521	–0.024	–	–	–	0.451	0.452	0.417

Item	Subs-cale	General			Internalising			Externalising			Methods		
		age 3	age 4	age 5	age 3	age 4	age 5	age 3	age 4	age 5	age 3	age 4	age 5
Q19 bullied	peer	0.623	0.565	0.530	0.085	0.101	0.326	–	–	–	–	–	–
Q23 adults	peer	0.208	0.148	0.450	0.347	0.359	0.142	–	–	–	–	–	–
Q05 temper	con	0.555	0.548	0.377	–	–	–	0.299	0.345	0.598	–	–	–
Q07 obedient (M)	con	0.262	0.328	0.335	–	–	–	0.314	0.412	0.683	0.428	0.456	0.368
Q12 fights	con	0.546	0.492	0.251	–	–	–	0.153	0.269	0.650	–	–	–
Q18 lies	con	0.547	0.449	0.235	–	–	–	0.294	0.165	0.664	–	–	–
Q22 steals	con	0.652	0.284	0.263	–	–	–	0.124	0.066	0.499	–	–	–
Q02 restless	hyp	0.326	0.359	0.401	–	–	–	0.668	0.650	0.869	–	–	–
Q10 fidgets	hyp	0.314	0.429	0.417	–	–	–	0.594	0.667	0.860	–	–	–
Q15 distracted	hyp	0.348	0.400	0.448	–	–	–	0.462	0.471	0.787	–	–	–
Q21 thinks (M)	hyp	0.197	–0.049	0.449	–	–	–	0.231	0.255	0.618	0.447	0.518	0.366
Q25 attention (M)	hyp	0.191	0.063	0.466	–	–	–	0.249	0.366	0.651	0.446	0.498	0.340

M, positively phrased problem questions (methods); emo, emotional; con, conduct problems; hyp, hyperactive

Exploratory Structural Equation Modelling (ESEM)

Further investigation of the model and its misfit was done via ESEM. As current development of ESEM methodology does not allow for cross-loadings on specific factors, the method factors were removed. Results are presented in Table 4.

Table 4. Standardized bifactor ESEM factor loadings the best fitting model (without methods factor) across three samples

Item	Subscale	General			Internalising			Externalising		
		age 3	age 4	age 5	age 3	age 4	age 5	age 3	age 4	age 5
Q03 complains	emo	0.538	0.654	–0.007	–0.082	–0.070	0.468	0.101	–0.020	0.120
Q08 worries	emo	0.670	0.643	0.036	0.122	0.227	0.854	–0.104	–0.039	–0.049
Q13 unhappy	emo	0.684	0.771	0.091	0.110	0.159	0.773	–0.027	0.086	0.214
Q16 nervous	emo	0.369	0.256	0.163	0.053	0.349	0.787	0.024	–0.020	–0.057

	Subscale	General			Internalising			Externalising		
Q24 fearful	emo	**0.462**	**0.577**	**0.185**	**–0.005**	**0.255**	**0.914**	–0.093	–0.085	–0.071
Q06 solitary	peer	**0.335**	**0.231**	**0.701**	**0.133**	**0.451**	**0.403**	0.047	0.045	–0.201
Q11 has friend (M)	peer	**0.042**	**–0.143**	**0.826**	**0.553**	**0.646**	**0.247**	0.131	0.214	–0.073
Q14 liked (M)	peer	**0.120**	**0.001**	**0.692**	**0.813**	**0.695**	**0.204**	0.166	0.334	0.295
Q19 bullied	peer	**0.580**	**0.507**	**0.271**	**0.100**	**0.229**	**0.445**	0.045	0.091	0.189
Q23 adults	peer	**0.365**	**0.163**	**0.288**	**–0.028**	**0.269**	**0.316**	0.001	–0.003	–0.169
Q05 temper	con	**0.501**	**0.575**	**0.318**	–0.057	–0.013	0.173	**0.422**	**0.353**	**0.638**
Q07 obedient (M)	con	**0.118**	**0.263**	**0.460**	0.321	0.162	–0.047	**0.521**	**0.549**	**0.674**
Q12 fights	con	**0.429**	**0.455**	**0.175**	–0.021	0.063	0.006	**0.340**	**0.342**	**0.791**
Q18 lies	con	**0.419**	**0.445**	**0.138**	–0.016	0.063	0.038	**0.482**	**0.204**	**0.862**
Q22 steals	con	**0.535**	**0.153**	**0.137**	0.112	0.284	0.039	**0.302**	**0.194**	**0.643**
Q02 restless	hyp	**0.313**	**0.435**	**0.586**	–0.148	–0.168	–0.095	**0.614**	**0.569**	**0.733**
Q10 fidgets	hyp	**0.328**	**0.497**	**0.587**	–0.103	–0.079	–0.071	**0.554**	**0.585**	**0.734**
Q15 distracted	hyp	**0.361**	**0.404**	**0.624**	–0.071	0.089	0.011	**0.452**	**0.479**	**0.625**
Q21 thinks (M)	hyp	**0.095**	**–0.166**	**0.643**	0.278	0.239	0.015	**0.392**	**0.474**	**0.548**
Q25 attention (M)	hyp	**0.098**	**–0.058**	**0.672**	0.260	0.328	0.053	**0.402**	**0.610**	**0.527**

M, positively phrased problem questions (methods); emo, emotional; con, conduct problems; hyp, hyperactive; bolding indicates theorised factor

Non-target loadings on internalising and externalising factors are of particular interest. Figures in Table 4 suggest that positively-worded items load on non-target factors but this might be the consequence of the fact that the method factor has been removed from this analysis. Apart from that, Q22 (steals) and Q02 (restless) load positively and negatively respectively onto the internalising factor for the age 3 and age 4 samples and item Q05 (temper) loads onto the internalising factor for age 5, suggesting a fairly substantial internalising component of those items. Similarly, item Q13 (unhappy) has a fairly large positive loading on the externalising factor at age 5 whereas item Q23 (adults) and Q06 (solitary) load negatively on the externalising factor.

DISCUSSION

In this analysis, we aimed to assess construct validity and factorial structure of the SDQ across three parent or teacher rated samples of multi-ethnic children aged 3, 4 and 5. Of the 11 configurations tested, we found that a bifactor model comprising the 2 broader scales plus the methods factor showed the best fit across all three samples. Further investigation of this configuration under ESEM methodology indicated several items that continued to contribute to model misfit.

Most CFA analyses have been conducted in older age samples and, in contrast to our study, have reported good fit when including the prosocial scale (Stone et al., 2010). We tested five configurations that included the prosocial scale but found acceptable fit only in the two age 5 samples that converged on a solution, and poor fit across the age 3 and 4 samples. This could be due to differences in the structure by informant, because the age 5 sample were teacher rated (which tends to have higher reliability (Stone et al., 2010), and differences in item-level response by informant have been reported (Goodman, 2001; Mellor & Stokes, 2007). Or, there could be less relevance of this dimension to younger age children, or other sample-specific differences. In studies that have assessed both teacher and parent questionnaires, an Australian analysis of 914 children aged 7–17 years failed to find adequate fit for any configuration (Mellor & Stokes, 2007), and Hill and Hughes (2007) found only marginal baseline fit for a five-factor structure for either informant in their sample of US children (mean age six). Similarly, CFAs conducted using data from three-year old Spanish children found only marginal baseline fit for either the teacher or parent rated version in five-factor first order and second order configurations (Ezpeleta et al., 2013). Croft et al. (2015) found a less than adequate fit (CFI = 0.905) for a five-subscale structure but did not test solutions not involving the prosocial scale. It is difficult to unpick the reasons for the variation in fit between samples for solutions involving the prosocial scale as our study is unusual in that we tested different configurations with it included and excluded. We did this for pragmatic reasons, however, as the prosocial scale is not generally used when computing scores to assess the risk of any relevant psychopathology, we suggest this approach is repeated in other samples to confirm our findings.

We noted generally improved fit across all configurations and increased loadings on factors for older children, which may indicate that the structure of the SDQ becomes clearer as children mature and disordered behaviour becomes distinguishable from extreme but 'normal' behaviour. The children in BiB, however, are still relatively young, and the lack of acceptable fit for several hypothesised structures even at age 5 could be related to cultural variation in implicit item meanings and standards for behaviour in a multi-ethnic community. Due to small sample size we did not examine invariance by ethnicity, focussing instead on investigating features of the SDQ common across samples rather than trying to distinguish differences between them. The presence of cross-loading and low-loading items also precluded an examination of DIF. We employed a novel ESEM analysis that allowed us to explore items that contributed to misfit in the seemingly well-fitting model and found that in the 3 and 4 age samples, two externalising questions (Q02 (restless) and Q22 (steals/spiteful)) loaded onto the internalising factor, as did question Q05 (temper) in the age 5 sample. Three internalising items in the age

5 sample loaded onto the externalising factor (Q06 (solitary), Q13 (unhappy) and Q23 (adults)). Differences in analytic methods make comparison of misfitting items challenging between studies. At least superficially, some broad comparisons can be drawn, but these are tentative and sample sizes, population heterogeneity, and methods may have altered size and pattern of any or all loadings. Theunissen et al. (2013) using CFA in a parent-rated Dutch sample of 3–4 year olds found that Q03 (complains) and Q19 (bullied) low-loaded (<0.3) in a five-subscale configuration, while Croft, et al. (2015) reported a loading of 0.39 for Q21 (thinks) in their 3 year old sample. In their CFA study of Spanish 3 year olds Ezpeleta, et al. (2013) found that Q22 (steals/spiteful) low-loaded (<0.4) on the parent-rated version in both five-subscale and second-order models whereas Q19 (bullied) low-loaded (<0.4) on the teacher-rated version in both models. This may indicate some problems with items 22 (steals/spiteful, conduct subscale) and 19 (bullied, peer subscale), and potentially others, that need further investigation.

Other studies have also reported marginal improvements in fit by adding a methods factor to account for the effects of both positive wording of problem items and prosocial items (McCrory & Layte, 2012; van de Looij-Jansen et al., 2011). McCrory and Layte (2012) also examined, as we did, the effect of a five-item methods factor within the 20 difficulty items in parent-reported SDQs for nine year old Irish children, finding that the methods factor accounted for only 4% of the common variance. We noted that methods factor items tended to have lower loadings on the general factor for the age 3 and 4 samples than age 5, indicating a potentially stronger effect of item wording on the structure in samples of younger children. This needs to be confirmed in other studies. We found that, similar to others, specification of bifactor models resulted in improved fit (Caci et al., 2015; Stevanovic et al., 2014). This is to be expected because the SDQ was constructed as multi-subscale unidimensional measure which is reflected by the suggested methods of scoring (Goodman, 1997).

Our results have clear practical implications. First, they suggest that the validity of SDQ at a younger age (especially at age 3) is questionable and we would advise caution before using it to estimate psychopathological risk in children younger than 5 years of age. Further validation of the reliability and predictive validity in different samples and using multiple raters will improve our understanding of the performance of the SDQ in children less than 5 years old. The construct validity seems to improve with increasing age of the sample, although this aspect needs further exploration and cross validation. Second, the bifactor structure, found to be the best fitting in our sample, is suggestive of improvements in the way the SDQ is scored. Currently, each of the five subscales are scored by summing responses about five discrete behaviours, but our results generally do not support giving separate scores on each subscale. The bifactor model shows that both total scores and scores on internalising and externalising items make conceptual sense but may not be optimal as either does not take aspect of the other (i.e. the total score does not take into account the internalising and externalising factors, and part of the variance of internalising and externalising scores are due to the common (general) factor underlying them). In addition, neither scoring system does not take into account measurement error which is expressed (beside item error variance) as the method factor in our bifactor model. To fully acknowledge the underlying structure of SDQ we therefore suggest using factor scores of the proposed bifactor model instead of traditional SDQ scores.

One obvious caveat of this approach is that obtaining factor scores is not feasible for clinicians. For everyday practice, sum scores or mean scores are much more practical and provide instant information on level of risk of psychopathology. For everyday clinical use or for screening purposes where accuracy of scores is of less concern, we recommend using the total score and/or sum scores of the broader internalising and externalising scales. When larger samples or cohort data are available, we recommend re-estimation of our proposed bifactor model (or an alternative model if our results are not cross validated) and using factor scores in analysis.

Specifying a bifactor model has additional pragmatic advantages when applied to heterogeneous samples such as BiB where there is less support for the hypothesised structure. An individual score for the general factor can be generated which is controlled for the 'measurement error' resulting from low-loading and cross-loading items on the broader scales, and from positively worded items. These scores can then be used in comparative analyses, broadly interpreted as a total difficulties score e.g. (Prady et al., 2015). Alternatively, the internalising and externalising scores can be generated and interpreted as scores after the common variance to all items (externalising and internalising) has been accounted for by the general factor, and controlled for variation from the methods factor. Obviously, which scores are used (total, or broader scales) depends on the viewpoint of which components contain the 'nuisance' variation, and, for this reason, factor scores should be interpreted with caution. We suggest, however, that where data do not demonstrate the expected structure, whether due to multi-ethnicity or young age, and smaller sample sizes do not permit the exploration of the influence of these factors on the structure, that the extraction and use of factor scores represents a pragmatic solution that seeks to minimise measurement error. This is particularly pertinent as populations become increasingly heterogeneous, along with our desire to ever-more accurately assess behavioural problems in ever-younger children.

Limitations of our findings come mainly from the multi-ethnic nature of our sample. Clearly, validity of the SDQ may be different across ethnicities and therefore the scale might be prone to differential item functioning (DIF). We tried to investigate DIF in this sample but experienced notorious non-convergence of DIF models. This might be for two reasons: 1) relatively small sample sizes within each ethnicity compared to the complexity of the estimated model; and 2) structural ambiguity of the SDQ, especially in samples of younger children. In the future, larger studies should explore DIF properties of the SDQ in detail. We considered that DIF by ethnic group would be the largest source of variation, and so did not explore other potential sources such as informant sex, but the influence of such factors could also be usefully examined in larger samples. In the future, further development work in longitudinal samples containing independent diagnostic information could explore the utility of age-weighting SDQ data from younger children.

In conclusion, we found less support for the hypothesised structure and robustness of the SDQ in a multi-ethnic sample of 3, 4 and 5 year old children, but some evidence that the structure becomes more clear as children age from 3 to 5 years. We suggest that factor scores extracted from a bifactor model that account for measurement error could be useful if carefully applied in epidemiological and kinanthropological studies reporting risk of psychopathology in heterogeneous or younger age samples. We recommend that further work explore commonalities in measurement of child behaviour problems in multi-ethnic samples.

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USING SPORTING MIGRANTS TO BUILD SECONDARY SPORT: A 12 YEAR CASE STUDY OF CZECH BASKETBALL

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ABSTRACT

This study examines the effects of the sport migration that occurred over a 12 year period in the secondary sport of basketball in the Czech Republic, in terms of its effect on the popularity of the sport within the culture. The factors of fan attendance and youth membership are isolated and measured quantitatively, using multi-level analysis within teams, between teams and at a federation level. The study was carried out in order to measure the effect of the use of immigrant athletes from an individual team management perspective and from a league growth perspective. It was found that while foreigners displace national athletes, fans were attracted to the use of foreigners and youth were attracted to play the game. The use of foreigners had the most significant correlations at the between team level to home attendance and final placement in the league. Multi-level analysis was used to show that the use of foreigners can be a facilitator for federations and team management to build the popularity of secondary sports in a culture, with certain limitations. This quantitative study of a secondary sport is an addition to the majority of the literature on sport migration, which has been largely conducted on primary sports from a qualitative, sociological perspective.

Keywords: sport migration; multi-level analysis; fan attendance; youth membership; sport popularity

INTRODUCTION

The sporting landscape is cluttered. The media increasingly show either the dominant sports in a culture or the new emerging sports. Secondary sports, or those traditional sports in the cultural middle ground, are left to fight for every fan and every potential participant. Add to this mix globalization factors such as media coverage of foreign leagues and new foreign sports, global flows of sport migration, and increasing power of sporting

companies over and above governing bodies (specially national governing bodies), and the battle for sport popularity within a culture is increasingly complex. Within this array of complexities we isolate and focus on the effect of sport migration on the popularity of these secondary sports. We have made an attempt to quantify and measure the specific effect of athletes entering and leaving secondary sports on the popularity of a particular sport within the culture. In measuring sport popularity within the culture we have focused on the markers of fan attendance at matches and youth registering to play the game.

Sport occupies a dual role in globalization, that of a motor for globalization and that of a measuring stick for globalization and the changes which it brings. Stiglitz defines globalization as "the closer integration of the countries and peoples of the world […] brought about by the enormous reduction of costs of transportation and communication, and the breaking down of artificial barriers to the flows of goods, services, capital, knowledge, and people across borders" (2003, p. 9). In one sense as long as competition between nations has existed there has been globalization in sport, because the nature of competition leads to the imitation of successful ideas. However a crucial element of globalization is the speeding up of this spread of ideas, money and people. Sports migration is one form of globalization where we can measure the form and its affects.

This study was undertaken to evaluate the practice of using immigrant athletes in the Czech basketball league as a cornerstone of the club business plan and sport growth. The long-term growth of the sport, in terms of both consumption and participation, needs to be examined in light of the globalization which is taking place. Increasing knowledge of the use of immigrant athletes in the Czech basketball league may provide insight into the effects of immigrant athletes on sport popularity in other cultures, particularly in secondary sports.

While the question of sport migration has previously been addressed primarily from a sociological viewpoint, it needs to also be addressed from a practical, managerial per-spective, as the question is in fact significant to the overall growth of sport in the culture. Sport clubs or sporting entities need to see not only business success from the top teams in their clubs (in terms of fandom and sponsorship revenue), but also growth in numbers of participants on their youth teams, in order to secure their future competitive position. Thus the use of immigrant athletes must be examined by both individual clubs and sport federations.

The sport of basketball in the Czech Republic provides an excellent starting point for such a quantitative examination, as the rate of sport migration has increased rapidly in recent years. This study represents a 12 year period from 1998 to 2010, in which the num-ber of foreigners grew from 11 to 56 out of an average 200 players in the highest Czech basketball league. During this 12 year period 18 teams were represented in the highest basketball league. The fan attendance of the games of these 18 teams and the number of youth registered to play the game of basketball in the Czech Republic are statistically examined as the number of foreigners increased. Basketball in the Czech Republic is a secondary sport behind the culturally primary sports of football and ice hockey.

The rules regulating the use of foreigners on teams changed 6 times over the 12 years studied. In the final season studied there were 45 foreign players in the highest league of Czech basketball. These 45 immigrant players represent over 34% of the total players in the Czech men's first division of basketball. The teams at the top of the league have the most foreign players, with five, and the ones at the bottom have the least, with one

and zero. Foreign players dominate the top end of the statistics for Czech basketball. In the spring of 2005, the Czechs naturalized their first foreigner for the purpose of national team play. American Maurice Whitfield became the first black Czech to wear the national team jersey just in time for the qualification rounds of the Euro 2005 basketball tournament, where he led the team as the playmaking point guard. While such practices appear almost normal today, the question remains: does the use of immigrant athletes build the popularity of a sport in a culture?

LITERATURE REVIEW

Although the practice of sport migration has been going on for over a century, it has picked up considerable steam in the last 30 years. There is a noticeable and well researched trend of athletes emigrating from countries with a wealth of talent in a particular sport to countries with weaker talent pools, due to the over-production of talent in their home countries. This can be evidenced by the presence of Canadian hockey players, American basketball players and Brazilian football players in many countries across the world, and some have even become naturalized and so eligible for national teams (Galily & Bernstein, 2008; Maguire, 1996; Poli, 2010a). There is a converse trend, which has been researched much more widely, of talent being siphoned out of the countries lacking wealth and power to the countries that have the wealth and power to create or participate in a monopolistic league (Harvey et al., 1996; Magee & Sugden, 2002; Maguire, 1996; Miller et al., 2003; Poli, 2010b; Poli, 2010a; Shukert, 2002). This can be evidenced in the migration of Latin American baseball players to play in North America's Major Leagues (Klein, 1989). Other studies have sought to show the correlation between the exportation of sport talent to the most prestigious leagues and the growth of their sports in their home culture (Galily & Bernstein, 2008; Lanfranchi & Taylor, 2001; Larmer, 2005). However, little has been done to research the effect of sport migration on the growth of secondary sports in a culture from a management perspective.

Basketball is a relatively weak sport in terms of popularity in the Czech Republic, where hockey and football (soccer) are overwhelmingly dominant. Athletics (track and field) and tennis are clearly the next most popular sports, followed by cross country skiing, basketball, team handball and volleyball (Čáslavová et al., 2007). The best Czech hockey and football players have exited the country to play in countries where they can ply their trade more profitably.

Basketball, however, holds a lower position in the hierarchy of Czech sport popularity and thus only three Czechs have made it to the prestigious NBA, while a rapidly growing number play elsewhere in Europe. However the guardians of the game in the Czech Republic have chosen to rely on a second tier of immigrants to build the game of basketball at home in the Czech Republic. This second tier is composed of immigrant athletes who are of insufficient quality to play in the North American NBA or the less prestigious FIBA Euro-League, yet they are talented enough to be the stars of the Czech basketball league. Thus we see illustrated in Czech basketball the same immigration trends we referred to earlier: importation of over-produced talent and siphoning off of the best talent from a smaller country.

There seems to be an observable pattern that sport leagues follow in their beginning, growth, reasoning, and legislation regarding the use of immigrant athletes. Teams bring in immigrant athletes to gain a competitive edge over their competition who are almost exclusively relying on national, or home-grown talent. Other teams follow suit in in an effort not to lose competitive ground. Teams justify this expense, at relatively high cost, with claims of maintaining competitive equity; fostering talent growth among young home-grown players through exposure to better players; and bolstering game attractiveness to fans. At some point, leagues place a limit on the number of non-national athletes each team may have on their roster and even on how many may be on the court or playing field at one time.

Perhaps the study closest to our own is Falcous and Maguire's 2005 sociological study, "Globetrotters and Local Heroes? Labor Migration, Basketball, and Local Identities" (Falcous & Maguire, 2005). Falcous and Maguire conducted a two-year ethnographic study of fans following the Leicester Riders elite basketball team in England. Their qualitative study involved in-depth interviews and focus groups with 28 individual fans of the Leicester team. The Leicester sporting landscape is dominated by three professional men's sports: football, rugby union and cricket, with basketball only on the periphery (Falcous & Maguire, 2005). This sporting landscape parallels that of the Czech Republic, in that basketball is not one of the sports dominating the landscape of Czech sporting culture. While Falcous and Maguire identify the sporting landscape and place basketball into that landscape, they are unable to measure the effect of sport migration on the growth of the secondary sport in that landscape. We will attempt to quantify this effect within and between teams in the Czech league.

The British basketball study parallels a brief 1984 study of the use of immigrant athletes in Finnish basketball, which found that owners insisted that the use of immigrants was necessary to win, and fans insisted on quotas for the number of immigrants allowed per team (Olin, 1984). Based on qualitative research, Olin asserts that the use of immigrant athletes is detrimental to the growth of the secondary sport of basketball within the Finnish culture. We will illustrate how this hypothesis can be tested quantitatively.

Falcous and Maguire point out in their 2005 study that, even though the International Basketball Federation (FIBA) passed legislation in 1998 to allow up to 10 foreign players per team worldwide, most European leagues had opted to allow only two foreign players, whilst Britain allowed up to five. Thus, including dual nationals, the British basketball league was composed of just under 30% foreign athletes through the 1980s and increased to approximately 50% in the late 1990s (47.4%, 1996/97; 53%, 1997/98; 52.6%, 1998/99) (Falcous & Maguire, 2005). This places the Czech Republic's current 34.5% foreigners in a comparable position to Great Britain in the mid 1980s.

Falcous and Maguire found a fairly complex interplay of the local and global at work among basketball fans interviewed. Broadly speaking, they found themes of: the positive necessary role of immigrants in team success; the desire for committed players in the context of local civic pride (more positive reactions were associated with an immigrant player who had played multiple seasons with the Leicester team); the marginalization of local players; and the desire for spectacle and entertainment brought by the immigrant players (Falcous & Maguire, 2005). Their study reveals the multi-layered identity politics which characterize the issue of sport migration in the globalization discussion. Each of

the themes identified by Falcous and Maguire can be quantifiably measured in relation to the business model of a local team and effect of migration on long term sport growth.

Falcous and Maguire suggest that their study shows that the use of immigrant athletes in British basketball has the potential to reinvigorate local culture through the global sport flow, but issue a caution as to the underdevelopment of the British game. They emphasize strongly that understanding the use of immigrant athletes cannot be seen as strictly an economic issue, which they find Miller et al. (2003) as falsely concluding (Falcous & Maguire, 2005). Finally, they cite the need for more empirically grounded case studies in order to understand the wider political-economic patterning of global sport (Falcous & Maguire, 2005). Our study of the use of immigrant athletes in Czech basketball fits precisely this need.

Raymore uses the terms 'facilitators' and 'constraints' to explain commitment to an activity. He defines facilitators as "factors that enable or promote the formation of leisure preferences and encourage or enhance participation" (Raymore, 2002, p. 39). Constraints on the other hand, inhibit or thwart interest and participation in leisure activities. Raymore says facilitators and constraints can be intrapersonal (individual traits and beliefs that result in predisposition to an activity), interpersonal (groups or individuals who encourage participation in an activity), or structural (intuitions or belief systems that promote an activity). These facilitators and constraints need to be identified and quantified in order to understand their influence on fan attendance and youth participation in a sport. Understanding whether the use of foreigners facilitates or constrains fans from attending games and youth from participating in a sport therefore needs to be understood at both the team and the federation level, in order to facilitate the growth of the sport in the culture.

METHODOLOGY

Data Selection

The data in this study were examined within teams and between teams over a 12 year time span. Additionally the data were examined in total on a league level across the 12 year period. The team basis within and across teams was focused on the examination of the relationship between the number of foreign players on each team to fan attendance. The league basis focused on the examination of the relationship between the number of foreign players to average fan attendance and the number of youth choosing to play the sport of basketball. The 12 year time span from 1998 to 2010 was chosen due to the rapid growth in the number of foreigners at that time, and the consequent multiple rule changes governing the use of foreigners. The study was discontinued in 2010 because the Czech Basketball Federation ceased collecting data on fan attendance.

On a team basis the current study is composed of 18 teams which played in the Czech MNBL (the highest Czech league) of professional basketball. The rules of play in this league state that each year the last placed of 12 teams will drop down to the 1st league of Czech basketball and the winner of that league will move up to the Czech MNBL. This explains our "messy design" in which only 5 of the 18 teams remained in the MNBL all 12 years. Each 9 month season spanned two calendar years and is denoted by the beginning

year of each season. The variables of final place, number of foreigners, fan attendance, other extra-league teams (ice hockey and football), city population and hall capacity are measured across time within and between teams. Final place was chosen because there is much variance within teams over the 12 year time period. Number of foreigners was chosen because they have increased from 11 to 56 out of the average 200 players in the top Czech league and it is the primary variable whose relationship to the others we are trying to understand. Hall capacity and city population were chosen because they remain relatively stable within teams throughout the 12 year period (time-invariant) and have been shown to be in relationship to fan attendance (Douvis, 2007; Hansen & Gauthier, 1989). Number of other extra-league teams (specifically from the primary sports of ice hockey and football) in the city was chosen because many researchers have identified this as a factor highly correlated to fan attendance (Douvis, 2007; Hansen & Gauthier, 1989; Rein et al., 2006; Westerbeek & Smith, 2002). These variables compose our first data set.

The second data set is much smaller than the first, as it is only composed of three seasons from the original data set. This data set was created in order to include the variable of team budgets. Team budget is an important variable, which we were not able to measure across all 12 seasons of time due to the difficulty in obtaining data and inaccuracies in these budgets. However, we have been able to obtain team budgets for three seasons (2006–07, 2007–08, 2008–09) which have been twice verified. This does not guarantee complete accuracy, but lends itself to a high degree of comparability. Thus the between team model was run separately for these three seasons in order to examine the relationship of team budget to the other variables.

The third data set is also a subset of the original data set. This data set, on a league basis, consists of the same twelve seasons as above. The variable of number of youth registered with the Czech basketball federation is of most interest to us at this level. Youth are defined as up to 19 years of age in the season of play. Youth membership has been adjusted as a percentage of the total Czech youth population between the ages of 5 and 19 for the given years. This was done to minimize the effect of the declining birth rates and thus present youth basketball membership growth relative to the eligible population. This variable is measured alongside the total number of foreign players playing in the MNBL each year, number of Czechs playing in the league each year, number of Czechs playing outside of the Czech Republic and the average home attendance. Other variables measured in the model on a league basis across time are number of times the MNBL was broadcast on Czech television and average hall capacity.

Data Analysis

The original data set is of a multi-level nature. Seasons are considered as level-1 units which are further nested within teams (level-2) units. Thus, two co-variance matrices instead of one were estimated for each level. The pooled-within teams covariance matrix belongs to level-1 and the scaled-between teams covariance matrix is observed at level-2. These two covariance matrices were estimated via a multi-variate multilevel procedure in the PRELIS programme (Jöreskog & Sörbom, 1999). Additionally the model was expanded to include budget, population and hall capacity and to run with the longitudinal second data set. This data set was analyzed using Pearson correlations. The multi-level

structure was ignored when budget was included, due to the smaller level of observations, and is only included for illustrative purposes. In addition to correlations, bi-variate regression analysis was performed. Subsequently, path-analytic models were conducted for both levels according to the rules and procedures commonly used within the structural equation modeling framework (Kaplan, 2008).

RESULTS AND FINDINGS

We will begin with some simple tables and scatterplot graphs to illustrate quantitatively the data over the time period under study in the Czech Republic. Then the relationships between these variables will be represented through two-level hierarchical modelling with correlation and covariance matrixes. Finally we will attempt to represent the indirect effects within these intended and unintended consequences through the use of path analysis.
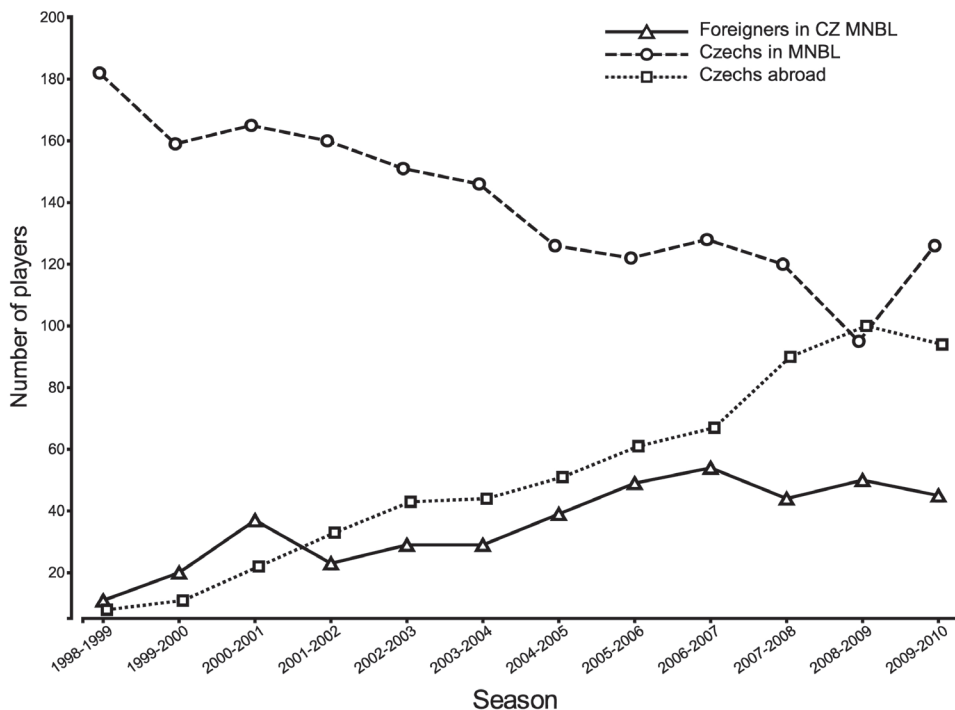
Figure 1. Use of Foreigners and Czechs playing outside the Czech Republic

The number of foreigners playing in the top Czech league increased steadily over the 12 years studied. The quadrupling of the number of foreigners is even more significant when one considers the concurrent decrease in Czech players.
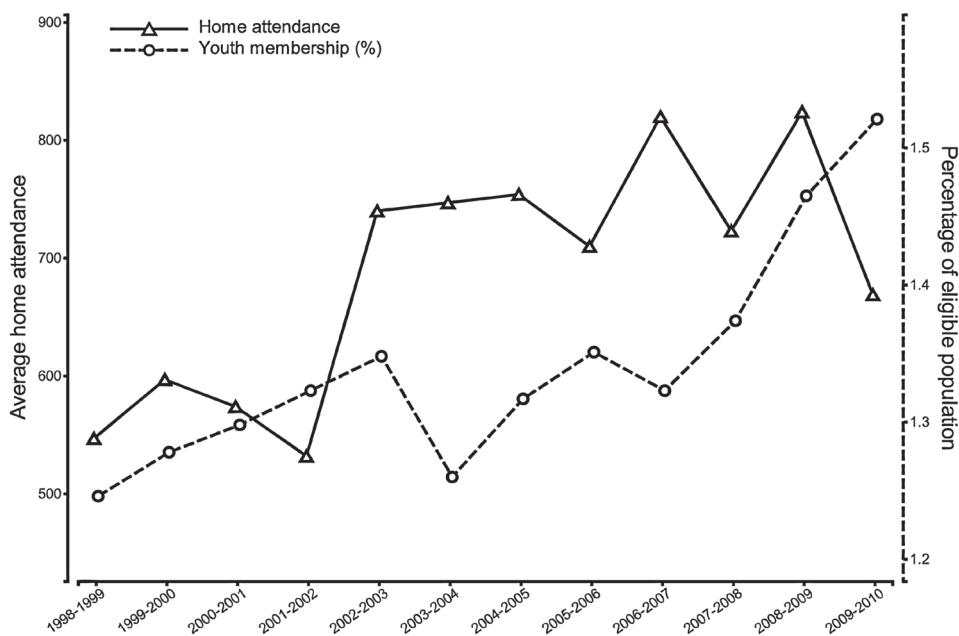
Figure 2. Fan Attendance and Youth CBF membership as a percentage of the eligible population

Fan attendance consistently increased over the time period being studied, just as the number of foreigners shown above. In fact, home attendance increased by 22.3%. This percentage has high elasticity simply because so few fans relatively attend basketball games (as compared to ice hockey or football). The biggest shift occurred between the seasons 2001–2002 and 2002–2003 (years 4 and 5).

Table 1. Basketball Federation Membership

Season	Total CBF membership	Youth CBF membership
1998–1999	41,198	25,411
1999–2000	41,168	25,328
2000–2001	40,768	24,967
2001–2002	40,553	24,834
2002–2003	39,728	24,614
2003–2004	35,761	22,461
2004–2005	35,985	22,900
2005–2006	36,032	22,931
2006–2007	38,592	21,908
2007–2008	39,075	22,256
2008–2009	40,328	23,325
2009–2010	40,788	23,745

The actual numbers represent an overall loss of 1666 total members or a 6.5% decrease in youth membership. However, when one takes into account the declining birth rate in the Czech Republic and its relative effect on the actual youth population eligible to play basketball each season, there is a 22% increase over the 12 year period as shown in figure 2 above.

Team Level analysis

Table 2. Descriptive statistics of full and budget-only reduced sample

	All teams over all seasons (N = 143)				Teams with known budget (N = 35)			
	Mean	SEM	Min	Max	Mean	SEM	Min	Max
Home Attendance	685.27	25.34	171	1,945	787.66	66.00	231	1,945
Away Attendance	686.26	11.63	403	1,180	788.20	16.80	636	1,180
Foreigners	2.97	0.19	0	8	4.11	0.35	0	8
Non-EU	1.68	0.12	0	6	2.57	0.19	0	6
Czechs	11.72	0.29	5	23	9.80	0.44	5	15
Final Place	6.46	0.29	1	12	6.34	0.58	1	12
Hockey Extraleague	0.52	0.06	0	2	0.46	0.11	0	2
Football Extraleague	0.83	0.11	0	5	0.57	0.19	0	5
Capacity	1,951.57	169.56	250	9,000	2,610.51	463.59	490	9,000
Population	286,394	98,517	13,400	1,157,800	197,166	54,100	13,400	1,157,800
Budget	xxx	xxx	xxx	xxx	16.69	1.61	8	50

The descriptive statistics above in table 2 paint a picture of all variables, measured for all teams, over the 12 year longitudinal period. The first four columns represent all 18 seasons, while the last four columns represent the three seasons 2006–2007, 2007–2008, 2008–2009 for which budget data was available. Budgets were measured in millions of Czech crowns. The three year average exchange rate for these seasons was 19.4 Kc / 1 USD and 26.7 Kc / 1 EUR.

The results of the multi-variate multi-level model are two co-variance matrixes, pooled-within teams and scaled-between teams. The pooled-within teams matrix is presented in table 3 and the scaled-between teams matrix in table 4. For both matrixes the bold entries on the diagonal are the variances. Entries below the bold variances are the covariances, and above are the respective correlations. The significant covariances are delineated with asterisks.

Table 3. Pooled-within teams covariance-correlation matrix

	Home Atten.	Away Atten.	Foreigners	Non-EU	Czechs	Final Place	Hockey	Football
Home Atten.	**55,886.70**	0.40	0.26	0.31	–0.33	–0.43	–0.12	–0.01
Away Atten.	10,302.82**	**11,855.32**	0.26	0.19	–0.40	–0.19	0.08	–0.03
Foreigners	99.43**	46.61**	**2.61**	0.73	–0.54	0.01	0.01	–0.04
Non-EU	88.43**	24.43**	1.41**	**1.44**	–0.42	–0.13	–0.02	0.00
Czechs	–198.18**	–109.34**	–2.22**	–1.28**	**6.45**	0.19	–0.05	0.19
Final Place	–232.08**	–47.54**	0.04	–0.36**	1.13**	**5.31**	0.17	–0.20
Hockey	–4.86**	1.44**	0.00	0.00	–0.02	0.07	**0.03**	–0.01
Football	–1.08**	–1.17**	–0.02	0.00	0.19*	–0.18*	0.00	**0.16**

Note. Bold entries on diagonal are the variances; values in the bottom-left triangle are the covariances; upper-right triangle contains respective correlations
**p < 0.01; *p < 0.05

Table 4. Between teams covariance-correlation matrix

	Home Atten.	Away Atten.	Foreigners	Non-EU	Czechs	Final Place	Hockey	Football
Home Atten.	**77.85**	0.98	0.63	0.43	–0.45	–0.66	–0.04	0.05
Away Atten.	726.64**	**7,012.15**	0.65	0.58	–0.56	–0.51	–0.13	–0.09
Foreigners	7.73**	74.71**	**1.91**	0.59	–0.76	–0.39	–0.27	–0.23
Non-EU	3.68**	47.06**	0.79**	**0.95**	–0.93	0.34	–0.48	–0.68
Czechs	–8.83**	–105.74**	–2.34**	–2.03**	**5.00**	–0.17	0.61	0.69
Final Place	–23.59**	–174.02**	–2.17**	1.35**	–1.53**	**16.65**	–0.25	–0.55
Hockey	–0.27**	–7.37**	–0.26	–0.33	0.95**	–0.70	**0.48**	0.86
Football	0.49**	–8.80**	–0.37**	–0.78*	1.80	–2.62**	0.69**	**1.35**

Note. Bold entries on diagonal are the variances; values in the bottom-left triangle are the covariances; upper-right triangle contains respective correlations
**p < 0.01; *p < 0.05

Using path analysis of the team means we can more clearly state a few of these significant correlations. An improvement of one place in the final rankings is equal to 54 more fans attending home games. Adding one more foreigner to the team draws 69.5 more fans, but if the foreigner is a non-EU foreigner the number of home fans drawn increases to 84. We can see the strength of the correlation between foreigners and final place in that one more non-EU foreigner is equal to an improvement of 1.2 spots in the final rankings. For each total foreigner there is 0.9 better placement in the final team standings.

The total correlation matrix based on the data set including the budget is presented in table 5. This matrix was calculated from the three seasons for which budgets could be obtained and is represented by 35 team entries (season 1: 12 teams, season 2: 12 teams, season 3: 11 teams).

Table 5. Correlation matrix based on data including budget, population, and capacity (N = 35)

	HA	AA	For	N_EU	CZE	FP	Hoc	Foot	Cap	Pop	Bud
Home Atten.	1.00										
Away Atten.	−0.08	1.00									
Foreigners	0.26	0.27	1.00								
Non–EU	0.09	0.12	0.64**	1.00							
Czechs	−0.19	−0.34*	−0.72**	−0.45**	1.00						
Final Place	−0.45**	−0.43*	−0.40	−0.20	0.45**	1.00					
Hockey	0.03	−0.19	−0.19	−0.29	0.23	0.26	1.00				
Football	−0.26	−0.08	−0.12	−0.28	0.25	0.18	0.65**	1.00			
Capacity	0.43	−0.11	−0.10	−0.35*	0.10	0.00	0.38*	0.15	1.00		
Population	−0.24	−0.11	−0.12	−0.41*	0.28	0.21	0.68**	0.84**	0.38*	1.00	
Budget	0.06	0.55**	0.35*	0.32	−0.46**	−0.62**	−0.51**	−0.64**	−0.03	−0.61**	1.00

Note. **p < 0.01; *p < 0.05

Using bi-variate regression analysis we were able to estimate that 1 million more Czech crowns ($51,546, EUR 37,453) is equal to 6 more fans and a 0.26 improvement in final place, or 4 million Czech crowns ($206,186, EUR 149,813) is equal to one final place improvement. When budget is measured against team composition numbers using regression analysis, 1 million more Czech crowns equals 0.066 more total foreigners and 0.037 more non-EU foreigners.

The relationship of percentage of youth in correlation with other variables is presented in table 6. This table uses Pearson correlations.

Table 6. League level correlation matrix (N = 12)

	For.	CZ MNBL	CZ out	HA	Hall Cap.	MNBL TV	Youth %
Foreigners in MNBL	1.00						
Czechs in MNBL	−0.86**	1.00					
Czechs playing outside CZ	0.82**	−0.92**	1.00				
Average home attendance	0.73**	−0.81**	0.70*	1.00			
Average hall capacity	0.68*	−0.72**	0.75**	0.67*	1.00		
MNBL regular season TV appearances	0.67*	−0.83**	0.95**	0.57	0.73**	1.00	
Youth index membership as population %	0.68*	−0.75**	0.60*	0.96**	0.52	0.45	1.00

Note. **p < 0.01; *p < 0.05

Path analysis diagrams
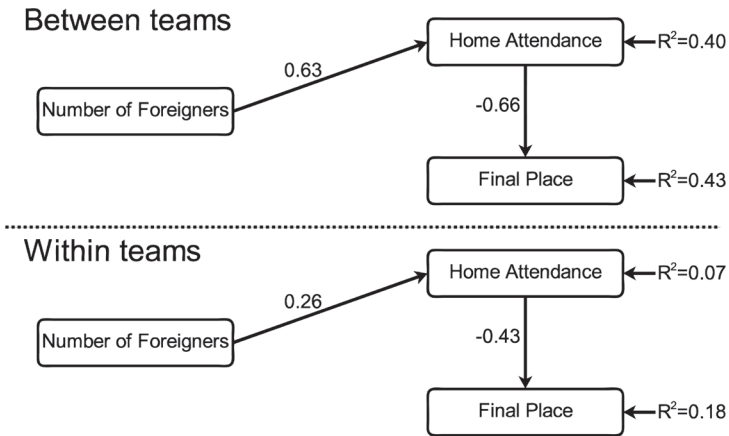
Figure 3. Two-level path model with standardized estimates

Fit indexes for the between-team level (N = 18): Chi-square = 0.05, df = 1, RMSEA = 0.00, SRMR = 0.01
Fit indexes for the within-team level (N = 143): Chi-square = 2.77, df = 1, RMSEA = 0.11, SRMR = 0.05

In order to find the path analysis diagram with the best fit many hypotheses were tested until the best fit was found. According to the rules of structural equation modelling the number of non-redundant elements of the covariance matrix must not exceed the number of observations. Furthermore, this is a necessary, but not sufficient condition; the suggestions on adequate sample size related to the number of free parameters are much higher (Kaplan, 2008). Thus, within and between teams we were limited to models which tested four or less parameters. We present a limited model with three variables, number of foreigners, home attendance and final place, which exhibit an acceptable fit both within and between teams. The model fits very well between teams (RMSEA = 0.00, SRMR = 0.01), and marginally within teams (RMSEA = 0.11, SRMR = 0.05). The direct path between number of foreigners and final place is not included because, in both cases, within and between, it was not significantly different from 0. Rather, this relation is indirectly mediated by home attendance. The magnitude of the indirect effect is a product of the two standardized path coefficients, 0.63 and −0.66, between teams, equaling −0.42 and is significant. At the within-team levels the magnitude of the indirect effect is −0.11 and is also significant. The significance of these results was obtained using Lisrel software (Joreskog, 1997).

Table 7. Czechs playing outside Czech

	Total	Austria	Belgium	Bulgaria	Cyprus	Finland	France	Germany	Hungary	Italy	Kuwait	Luxemburg	Holland	Poland	Serbia	Slovakia	Slovenia	Spain	UK	USA
98–99																				
99–00	**11**	3						2								4				2
00–01	**22**	6					1	5						1	1	4	1	1		2
01–02	**33**	6					2	6		2					1	7	1	1		7
02–03	**43**	9			1		2	11		3						12	2	1		2
03–04	**44**	10					1	11		3						12	2	1		4
04–05	**51**	12			1	1	3	15	2	3						8	2	1		3
05–06	**61**	11		1	3	1	4	18	2	3		1				12	2	1		2
06–07	**67**	10			3	3	3	15	3	3		1		1		10	4	2	4	5
07–08	**90**	12		1	6	3	2	18	4	2		1	4	1	2	14	3	4	4	9
08–09	**100**	13	2		8	2	4	19	3	5	1	2	3	2	2	12	5	2	6	9
09–10	**94**	12	1		7	2	3	18	3	3	1	2	3	2	2	11	3	12	5	4

Table 8. Foreigners playing in Czech

Year	Total	Bermuda	Brazil	Canada	Congo	Croatia	England	Finland	France	Greece	Hungary	Latvia	Lithuania	Macedonia	Moldova	Poland	Russia	Serbia	Slovakia	Slovenia	USA
98–99	**11**					3				2							1	1			4
99–00	**20**					4				1							2	2	5	1	5
00–01	**37**					7				1					1		3	6	10	1	8
01–02	**23**					2				1							2	2	7		9
02–03	**29**					4				1								4	10		10
03–04	**29**					5				1			1					2	11		9
04–05	**39**		1			5							1			3		5	13		11
05–06	**49**		1			3	1				1		2	1		2		12	9	2	15
06–07	**54**					4	1	1	1	1						2	3	7	13	2	19
07–08	**44**	1				3			1	1	1					1		4	8	1	23
08–09	**50**			1						1			4			4		2	10	2	26
09–10	**45**			2	1					1		1	3			2		1	11		22

DISCUSSION

The quantitative statistics and models presented are meant to test the theories observed in previous qualitative studies, aiding in an examination of sport migration from a management perspective. The quantitative results are not meant to replace or supersede the qualitative results of other studies, and also must be observed within the cultural context of Czech sport, where basketball is a secondary sport. Falcous and Maguire found that immigrant athletes were positive for team success in their study of Leicester basketball (2005). Our study supports this correlation between teams over a 12 year period.

A significant factor considered in our study was hall capacity, as it is directly correlated to fan attendance (0.67 in table 6). Perhaps in order to keep up with the increases in fan attendance, or perhaps driving the increases in fan attendance, the capacities of the basketball halls in the MNBL have increased dramatically. The lowest average hall capacity was 1425 in the 2001–2002 season; while the highest was 2626 in the 2006–2007 season. In any given year, these halls have been about 40% full, with a low of 27% in 2007–2008 and a high of 51% during the 2002–2003 season.

Now we move to the quantitative representation of the correlations between the use of immigrant athletes and team success. We begin at the within-team level, which represents each team measured against itself for each year they were in the MNBL. At the within-team level we do not find many strong correlations beyond team composition. A negative correlation (−0.54) between the number of foreigners and number of Czechs is observed here, and verifies the qualitative findings of other researchers that, as the number of foreigners increases, the number of nationals on a team decreases. The negative correlation (−0.43) between home attendance and final place shows that there is some effect on the performance of the team and the resulting attendance from year to year (as home attendance goes up, final place goes down, meaning that it improves), but it does not appear to strongly effect fan attendance. The correlation between home attendance and number of foreigners (0.26) is not strong at this level. Finally, there appears to be almost no correlation between fan attendance at basketball games and the presence of the primary sport teams of ice hockey (−0.12) or football (−0.01) in the same market from year to year. These three correlations at the within-team level seem to indicate that the local market for the secondary sport of basketball is relatively stable in the Czech market, and is not heavily effected year-to-year by a team's use of foreigners, final place, and whether or not there are other extra-league teams in primary sports competing for fans in the local market.

Now we move to the between-team level where each team is measured against all other teams. At the between team level, the effect of foreigners on both home (0.63) and away (0.65) attendance is correlated much more strongly than we observed at the within team level. Additionally, the correlation between the number of foreigners and the final placement of the team is strengthened at this level (−0.39). The more foreigners a team has, the better final place they achieve compared to those teams with fewer foreigners. We also observe a stronger negative correlation in team composition at this level (foreigners to Czechs: −0.76). The more foreigners a team has, especially non-EU foreigners (−0.93), the fewer Czechs the team will employ. Again this verifies the qualitative findings of others. Foreigners do indeed take the playing spots of national players. The correlation between home

attendance and final place is also strengthened at this level between teams (−0.66), so while individual teams appear resilient in their fan attendance from year to year, the better a team does it will draw more fans than a weaker performing team in another city. Finally the presence of extraleague teams in the primary sports of ice hockey (−0.04) and football (0.05) do not take away from secondary sport basketball fans attending games between teams.

When we examined the three years for which we have team budget information our observed correlations remained stable. More foreigners improves final team placement (−0.40) and decreases the number of Czechs on a team (−0.72). The second strongest correlation to budget is that of final place (−0.62), which suggests that money buys success. Specifically, we saw that 4 million Czech crowns ($206,186, EUR 149,813) yields an improvement of one final place. Budget had no real correlation to home attendance (0.06), and only marginal affect (0.35) on the number of foreigners purchased. Since we do find a strong correlation between number of foreigners to final place and home attendance at the between-team level, we interpret these findings to mean that a larger budget does not allow a team to purchase more foreigners, as they are using the maximum allowed by the rules already, but to buy higher quality foreign and Czech players.

Interestingly, we observe that the presence of ice hockey (−0.64) and football (−0.51) teams decreases the available budget to the team. This goes hand in hand with population (−0.61), in that higher population cities have more teams in the extra-leagues of the primary sports, and thus less money for the secondary sport of basketball. So while one might expect teams in higher population areas to have higher budget teams, the opposite is actually true due to the money flowing to the more visible sports in the culture present in those cities. Thus on the team level the presence of extra-league primary sport teams has a much greater effect on fan attendance than either the use of foreigners or final placement in the league.

At the league level the correlations are significantly stronger than were seen previously, but this must be tempered with the low sample size of 12 seasons. The highest correlations exist between the immigrant and emigrant Czech players (−0.92). Of course, this goes hand in hand with foreigners taking roster spots of Czech players, where we see a correlation of −0.86 at the league level. The more Czechs leave to play in other countries, the fewer Czechs are left to play in the MNBL. The more foreigners come to play in the Czech MNBL the fewer spots there are for Czechs in the home league and the more emigrate to play in leagues outside the country. This process appears to be somewhat strongly correlated to average home attendance in all three areas of number of foreigners in the league (0.73), number of Czechs in the league (−0.81) and number of Czechs outside the league (0.70). This seems to indicate that fans are positively disposed to the presence of foreign players and not negatively affected by the exodus of Czech players. The fans actually seem to like it better when there are less Czechs playing. This is a very different finding from many previous qualitative studies (Falcous & Maguire, 2005; Jackson & Andrews, 1999; Klein, 1991a; Maguire, 1996; Olin & Penttila, 1994).

As per youth membership in the CBF the correlations are similar to those seen with home attendance (0.68). Youth appear to be drawn to playing the game with the presence of foreign players, and the exodus of Czech players is also correlated to youth playing the game (0.60). Again this is contrary to the majority of the literature on the use of sporting immigrants to date. The strongest correlation observed is that between home attendance

and youth participation (0.96), meaning that the more youth who are playing the game of basketball, the more will attend basketball games.

Falcous and Maguire found that local players became marginalized on the Leicester team with the presence of immigrant athletes. We found this correlation to hold at both the team level across time and between teams. However, the British basketball study cautioned that the increase of foreigners could lead to the under-development of the British game and found fans to accept the presence of these foreigners only on negotiated terms. Our study, while agreeing with Falcous and Maguire that fans like the spectacle and entertainment brought by foreign players, differs from their conclusion, since we observed increased youth participation in the sport in correlation with the presence of foreigners.

Olin also indicated that fans were in favour of quotas on the number of foreign players, while the owners insisted that foreigners were necessary to win in the Finnish context (1994). We have been able to quantify this stated necessity of foreigners to win. This was most evident at the between teams level of our path analysis diagram, where we saw that not only did the number of foreigners have a direct effect on final place, but also an indirect effect by adding a "sixth man on the court" in the element of fan attendance.

The Czech teams are getting closer and closer to using the maximum number of foreigners allowed and, as stated previously, changed their rules regulating foreigner use six times during the 12 years studied. The recent arguments they have used have not been about fan response to foreigners, but about the under-development of youth and the emigration of young Czech basketball players to play outside the Czech borders. Our quantitative findings show the argument from increased use of foreigners leading to increased emigration of young Czech players valid, but suggest the resulting under-development of youth to be invalid.

The question of youth development becomes one of who is developing a nation's athletes, or where are they being developed, in a globalized sport environment. As cited at the beginning of this article, most researchers have found that, in the case of sport emigration, the best athletes leave to go and play in countries of greater wealth and power. This finding also holds true in the Czech case as can be seen in table 7. The table of emigrants shows the rapid increase in players leaving to play in other countries over the last twelve years. It also shows that the majority go to wealthier, neighbouring countries like Austria and Germany. Note that there are increasing numbers going to the top basketball leagues in Europe (season 2009–2010, Spain: 12, Italy: 5). And finally we see that, as time has gone on, players are going to more places, which is the same globalization trend which could be observed in the primary Czech sports of football and ice hockey. Examining the basketball emigration data closer reveals that players are leaving Czech at younger and younger ages in order to pursue better development in foreign basketball academies, such as in Spain and Italy. So, while it is true that more Czech basketball players are leaving with the increase of foreign players, they are going to countries where there is more money and basketball is a more primary sport. Thus, from a youth development perspective, the increase in the number of foreigners and the success of Czechs outside Czech borders is drawing more Czech youth to basketball, and many of those who leave the country to play are actually going to countries with better development opportunities.

The table of immigrants playing in the Czech Republic (table 8) shows that the majority of players come to the Czech Republic from the USA and the former Yugoslav

republics. It is only in the second half of the period studied that we see players coming from other European countries. This can be attributed to the Czech Republic joining the European Union in 2004 and the consequent rule changes to the number of players allowed from the EU. Further we observe that the inflows of immigrant athletes are not only smaller than the outflows, but that the distribution of wealth and power represented is different as well. While most authors have stated this globalization flow as negative, Klein's anthropological studies (1991b) found such flows to help the growth of the sport in the home culture. Our quantitative analysis found similar correlations with the strong tie between foreigners coming to play in the Czech Republic and Czechs going to play abroad, to increased home attendance and youth participation in the sport.

We would suggest that the overall popularity of Czech basketball has increased to a limited level compared to other secondary sports in the Czech Republic with the increased use of foreign players. If true, this is remarkable, as the Czech Republic is largely a closed, homogeneous culture with a low percentage of immigration, and so acceptance of immigrants would not be expected (Gartner, 1989; Hofstede, 2001; Westerbeek, 1999; Burjanek, 2001; Hampl et al., 2007; Lolashvili, 2011). Thus we would suggest there is a limit to this acceptance which has not yet been met in the fandom of Czech basketball. Meaning that as foreign players come into the Czech league the affect will be positive on popularity only as long as the Czech players, or at least white European players remain the visible, dominant majority on the court. We speculate that the current ratio of 34% foreigners is approaching this cultural limit of acceptance.

What is interesting to note, from the raw data obtained, is that attendance numbers went up in the smaller cities when more foreigners were used, but only for the first year. It is thus hypothesized that, after the first year, the interest from fans in someone or something different, tapered off back to the previous home attendance numbers. This was reflected in the low within-team correlation between number of foreigners and home attendance. However, when we look more closely at the data, home attendance did not taper off when the level of team play rose significantly and then remained at the higher level in consequent years. This is partially reflected in our path analysis diagram in the results. It also tapered off less in cities where the star foreigner stayed for more than one year (although teams performing outside the top three in the league and yet retaining a star foreigner was very rare – only 6 occurrences in 12 years). As shown in a related study regarding the use of foreigners in marketing, this lack of retention of star foreigners outside of top teams represents a lack of understanding of fandom on the part of the owners and team management (Crossan, 2015). Mullin, Hardy, and Sutton suggest that consumers are constantly filtering and interpreting cues about sport products relative to their self-image, and thus there must be a convergence of the core sport product (the extra-league team and its star players) and the consumer (the fan and/or the potential youth participant) (2007).

CONCLUSION

This study has attempted to study the phenomenon of sport migration within a secondary sport using quantitative analysis. The phenomenon of sport migration has previously been studied predominantly in primary sports using qualitative analysis.

Additionally sport migration has been studied primarily as a sociological phenomenon within the realm of globalization. We have attempted to draw from this sociological framework and bring practical managerial significance to those working within sport clubs and federations.

We set out to study the use of migrant athletes to build a secondary sport and its effect on sport growth in that country. Specifically, we measured the correlation between the use of foreigners and the effect on attendance and youth development. Consistent with other research the reliance on foreigners was highly correlated to a decrease in reliance on home-grown, Czech talent. However, in contrast to most other sport migration research, we found a corresponding increase in fans attending MNBL basketball games and increase in the number of youth choosing to play basketball. So we can tentatively say based on our results that the use of foreigners has increased the popularity of the secondary sport of basketball in the Czech Republic.

The use of multilevel hierarchical analysis, regression analysis and path analysis as quantitative tools in the study of the observed globalization phenomenon of athlete immigration appears to be a useful addition to the previous research. By isolating and quantifying the effect of immigrant athletes on fan attendance through final place we are able to aid the local club deciding whether the use of foreigners will benefit their business model. These tools, with particular emphasis on multilevel analysis and path analysis are particularly helpful when examining this form of globalization as historical, cultural, economic, and emotional factors can each be taken into account. Additionally these tools allow one to examine both the intended and unintended results of the legislation changes the Czech Basketball Federation has made with regard to the use of foreigners. There are obvious limitations to the quantitative model we have used based on the variables measured. However multilevel hierarchical models are robust and other variables could be substituted or added to measure their effect on the sport in a culture. We have applied this model to measure the effect of sport migration in a secondary sport, but applying this model to primary sports and comparing correlations between cultures could add much to our understanding of the effects of this form of globalization within and between cultures.

While we found strong correlations between the use of foreigners and the home attendance at games as well as the use of foreigners and the number of youth registered to play the game of basketball, there are numerous limitations to this research. The most significant of these limitations is that this research has been carried out on a secondary sport, meaning a cultural space less tied to national identity and more malleable to the forces of globalization. As Maguire and others have cautioned, even when commodified acceptance of the use of foreigners is found in a culture, there are still limits to the culture's tolerance of this form of globalization (Klein, 1991b; Falcous & Maguire, 2005; Farred, 2006; Poli, 2010). As the repeated rule changes of the Czech basketball federation evidence, just as sport managers use sporting immigrants in order to maintain competitive balance, so there remains a need to balance the use of immigrants with the use of national players, while building strong sport clubs and the sport within the culture.

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THE TOSS OF THE PROFESSIONAL
AND THE COMPETITIVE TENNIS PLAYER:
SERVING FROM THE AD-COURT

JAN CARBOCH

ABSTRACT

We compared the serve toss of different types of serve when tennis players served from the ad-court. They used different spin on the ball and various ball placements in the opponent's service box. Our aim was to compare the toss in different types of serve between a competitive (local tournament) player and a professional player, from the point of view of the receiving player, when they served from the ad-court. One professional and one competitive tennis player (both right handed) were observed while serving different types of serve to various locations of the opponent's service box. We used a high-speed camera, which was placed opposite to the server in the position of a receiving player. The results showed that the players do not use the same toss for each type of serve. The professional player had a bigger range of racket-ball contact point on horizontal axis (32 cm) of the various types of first serves, compared to the competitive player (only 24 cm). The toss of the kick serve had similar characteristics between both players (the racket-ball contact point was observed to be mostly to the right, from the view of receiver). Neither the professional nor the competitive player showed a stable profile of toss. In some cases, the receiving players could anticipate the type of the serve from the server's toss.

INTRODUCTION

Every rally in tennis begins with a serve. If the server misses the first serve (makes a fault) he or she can hit the second serve. If he/she misses the second serve too, it is a double fault and he/she loses a point. The serve is one of the most difficult strokes in tennis and has already been described (e.g. Abrams et al., 2011; Carboch et al., 2014; Chow et al., 2003; Cross, 2011; Sakurai et al., 2013). The serve motion starts with the ball toss, which

is crucial for the whole stroke. The players need to toss the ball with stability, and need to control the toss. Gilet et al. (2009) say the serve and the return are the strokes that most affect the results of tennis matches, even on clay courts (the slowest surface). The ball speed after the serve can often reach over 200 kph in professional tournaments. This means that the receiving player has to react very quickly. Even though the ball decelerates on the way to the receiver, the ball travels to him/her in 0.5–1.2 s, depending on the serve quality, ball spin and surface (Dunlop, 2000; Kleinöder, 1997).

Vaverka (2010) compared serve speed between genders in professional tennis. He reported that male tennis players reach an average speed of 184 kph in the first serve and 149 kph in the second serve. Female tennis players reach an average speed of 155 kph in the first serve and 132 kph in the second serve. The Australian Open winner in the men's tournament in 2015 served an average 190 kph on the first serve and 158 kph on the second serve (Australian Open, 2015). Crespo and Miley (2002) say that women have less muscle mass, relatively narrow shoulders, wider hips and shorter legs than men. For women, that means less favorable biomechanical conditions for many physical activities compared to men, on which depends the total force that can be developed (Crespo & Miley, 2002). Male competitive tennis players are expected not to be so physically fit and prepared as professional players and therefore competitive players can't develop such force and serve speed as the professionals.

Players can serve various types of serve, i.e. a flat serve (no or minimum spin on the ball), a slice serve (side spin) or kick serve (topspin) (Crespo & Miley, 2002). According to Cross (2011), when a player serves the kick serve (KS) a side spin is also generated together with the topspin. The KS is relatively slower, but the ball bounces very quickly and very high. The KS is usually served to the opponent's backhand. The flat serve (FS) is about the highest speed. The ball trajectory during the slice serve (SS) is curved. The ball turns to the side, from right to left (in the case of right-handed server). The second serve is slower because players use more spin to control the ball. Players need to achieve high efficiency of the second serve, too.

The receiving players need 0.2 s to estimate the ball trajectory (Crespo & Miley, 2002). After that, they have a very short time for movement to return the ball. However, the receiving player can gain more time if he anticipates correctly. Experienced players focus their vision on the opponent's shoulder-racket area (Singer et al., 1996). Crespo and Miley (2002) say that advanced players should use the same toss for every type of serve to hide their intentions.

In a similar previous study, Carboch (2015) examined professional and amateur players, when they served from the deuce court. He found individual style differences in toss execution between the players, and also found toss differences among serve types (only some types of serves had similar toss trajectory – and both players did not use the same toss for each type of serve).

The aim in this study is to compare the toss in different types of serve between a competitive (local tournament player) and a professional player from the point of view of the receiving player, when they served from the ad-court.

METHODS

In this case study we observed one competitive and one professional tennis player. The competitive player was a club level player. He was 23 years old, right-handed and ranked 136 in the Czech Republic (national ranking). At the time of measuring his weight was 73 kg and he was 181 cm tall. The professional player was regularly playing ITF (International Tennis Federation) and ATP (Association of Tennis Professionals) Challenger events. He was 27 years old, right-handed and his ATP ranking was 296. He was 184 cm tall and his weight was 76 kg at the time of measuring.

After finishing a standard match warm-up, the participants were told to serve with maximum effort, exactly the same way as in a match. Every serve was made from the same place. The participants served from the ad-court. There was a mark on the court, which was a starting position for each trial, placed on the baseline 1 m to the left of the center service mark. The participant started every serve from this mark by touching this mark with the tip of his front leg. First, he served a FS wide (FSW) – which means in the direction of the side line of the service box on the receiver's end of the court. After 3 successful trials, he served a FS to "T" (FST). "T" or "T-line" is the junction of the center service line and service line (figure 1). Next, the participant served a second serve wide (2W), followed by a second serve to T (2T), followed by the KS wide and SS to T. The KS and SS were served as a type of first serve. The target area was 1 m wide 3 m long. It corresponded to the zones where players normally place the serve (wide and T). In total, the participant reached 18 successful serves from the ad-court. The action was recorded by a high-speed camera (Basler GenICam piA640-210gc) with a frequency of 200 Hz. The location of the high-speed camera was at the point where the receiver stands on the opposite end of the court. The camera was placed 1 m behind the baseline, 0.5 m from the side line for singles towards the center of the court and at the height of 1.6 m, so that we could see the server's action. The serve speed was measured by radar (Stalker Pro II), which was placed next to the high-speed camera.
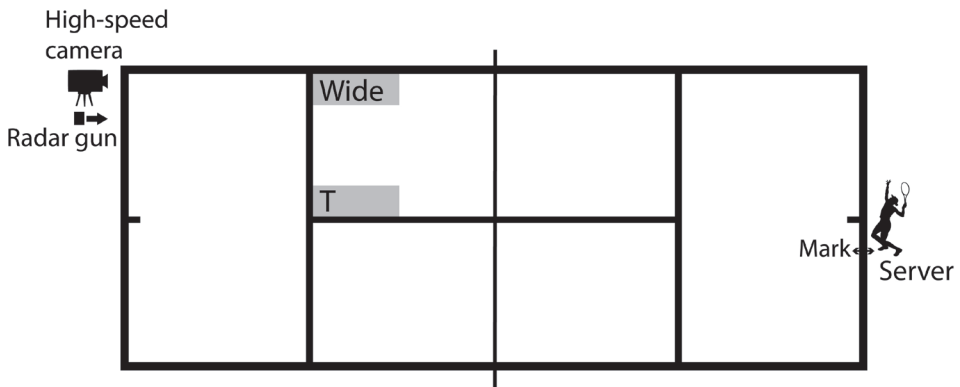
Figure 1. Experiment set-up

The records were analyzed using 2D analysis. Cartesian coordinate system was defined prior to each trial to prevent foot displacement, even though players started their motion from the same place. Horizontal axis X and vertical axis Y were used from the point of view of the receiving player (figure 2). Point 0 of these axes was set at tip of the server's front leg. Using software *Dartfish 7*, we analyzed the ball toss 1) at the ball release point from the server's hand; 2) at the highest point of toss; 3) at the point of the racket-ball contact. We have two players with different height (181 and 184 cm), which we have to take into account in observed variables. The data were analyzed using descriptive statistics.
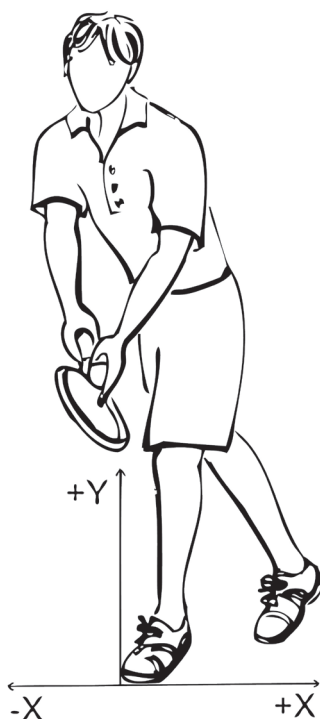
**Figure 2.** Orientation of global coordinate system

RESULTS

Altogether, we analyzed 18 serves of the professional and 18 serves of the competitive player. We evaluated 6 types of serve (6 × 3). Mean values and standard deviation of all observed variables from 3 successful trials for each type of the serve are shown in table 1. Both players had very similar ball release point for their own serves. Inter-individual comparison, the competitive player released the ball on the average 21 cm higher compared to the professional. The competitive player used a higher toss (mean height 396 cm), which was 39 cm more than the professional. However, the professional contacted the ball with his racket 7 cm higher, i.e. at the mean height of 286 cm. The mean of the competitive player's serve speed was 16 kph lower compared to the professional player.

Table 1. Mean values of all observed variables

|	Type of serve	Ball release (cm)		Toss maximum (cm)		Racket-ball contact (cm)		Serve speed (km/h)	Speed difference
		X	Y	X	Y	X	Y		
Competitive player	FSW	−28.7 ± 2.1	195.0 ± 1.2	12.7 ± 6.7	376.7 ± 4.9	26.0 ± 7.2	268.3 ± 2.9	178.7 ± 2.5	−10.7
	FST	−32.0 ± 3.0	195.0 ± 0.6	12.7 ± 11.0	391.3 ± 9.1	43.0 ± 13.0	279.3 ± 2.3	172.7 ± 3.5	−16.7
	2W	−31.0 ± 2.0	191.3 ± 4.0	17.0 ± 5.2	400.3 ± 9.5	37.3 ± 8.3	280.0 ± 5.2	148.7 ± 2.3	−8.3
	2T	−31.0 ± 6.2	193.7 ± 1.2	21.7 ± 9.2	403.0 ± 8.2	53.0 ± 14.2	281.0 ± 8.0	127.7 ± 5.5	−32.3
	SS	−30.7 ± 2.5	193.7 ± 1.5	11.3 ± 2.5	401.7 ± 5.1	36.3 ± 8.1	283.0 ± 4.0	156.3 ± 4.9	−18.7
	KS	−29.7 ± 2.5	195.3 ± 6.5	24.0 ± 7.2	407.7 ± 4.9	49.7 ± 7.2	283.0 ± 2.6	132.0 ± 3.0	−8.0
Professional player	FSW	5.3 ± 1.5	175.0 ± 2.6	18.7 ± 5.0	357.7 ± 9.0	20.3 ± 7.0	286.0 ± 5.6	189.3 ± 2.1	10.7
	FST	7.7 ± 0.6	170.7 ± 3.8	16.0 ± 5.6	365.3 ± 4.5	14.3 ± 7.0	284.0 ± 1.7	189.3 ± 3.8	16.7
	2W	7.7 ± 2.5	171.3 ± 1.5	26.3 ± 6.7	362.0 ± 3.6	32.7 ± 6.8	284.7 ± 1.5	157.0 ± 4.1	8.3
	2T	6.3 ± 2.1	171.0 ± 2.6	24.7 ± 3.2	364.0 ± 8.2	30.7 ± 2.1	285.0 ± 2.0	160.0 ± 9.2	32.3
	SS	5.0 ± 2.6	173.0 ± 4.4	24.3 ± 7.6	367.7 ± 3.1	30.3 ± 11.2	284.7 ± 1.2	175.0 ± 9.2	18.7
	KS	6.3 ± 0.6	174.7 ± 1.5	33.7 ± 3.5	364.3 ± 2.1	46.7 ± 7.1	282.0 ± 4.0	140.0 ± 10.0	8.0

The competitive player's release point was recorded much more to left, from the receiver's point of view (about 24 cm). The ball motion during the toss of the first serves is shown in figure 3. We can see differences between the participants and between types of first serves. The toss trajectories are different. The KS racket-ball contact point was mostly to the right from all serves by both players. The same happened during the FS (wide and T), but to the left side. Although both players had very similar ball release point for all types of serves, the racket-ball contact point differed on the horizontal X-axis. Surprisingly, the professional had a range on this axis of 32 cm (between FST and KS); and the competitive player only 24 cm (between FSW and KS).
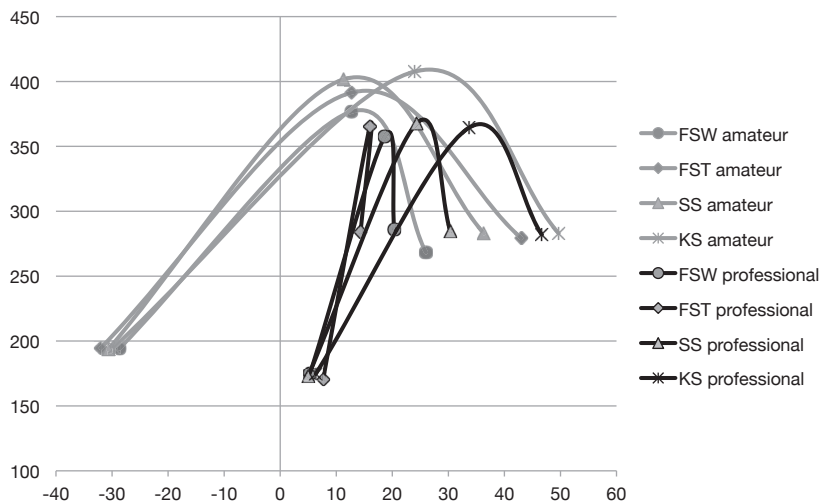
Figure 3. Serve toss comparison among different types of the first serves

The toss trajectories of the second serves are shown in figure 4. The ball release point of the competitive player is more to the left (individual style difference). As with the first serves, the competitive player contacted the ball lower. Also here, the competitive player used a higher toss. The competitive player had the second serves' racket-ball contact point 4 cm lower. The contact points on the X axis of the professional 2T and 2W are almost the same (2 cm difference). However, the competitive player has the racket-ball contact point of 2T 16 cm to the right than his 2W. That means, there is no chance of anticipating the direction of the second serves of the professional player. On the other hand, the second serve toss of competitive player provides some cues for anticipation.
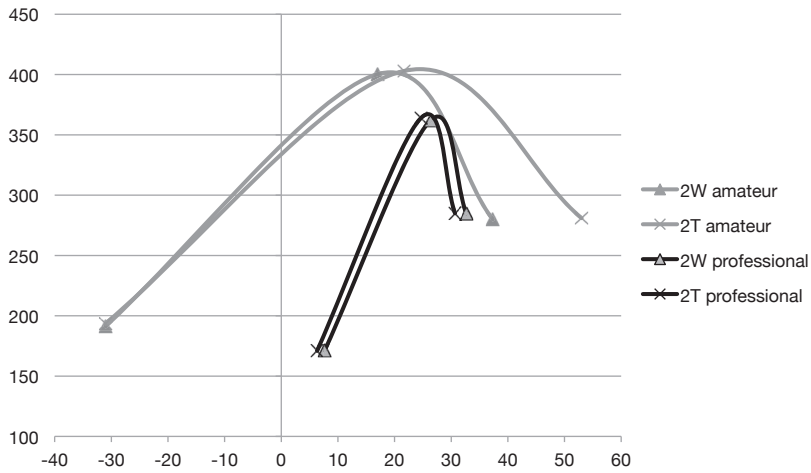
Figure 4. Serve toss comparison between directions of second serves

Interesting results were found on the horizontal X axis. The ball moves during toss (shift on X axis from the ball release point to the racket-ball contact) within different serve types (table 2). Both players had high values when they served the KS. This table also shows that the competitive player had a different style of serve toss execution.

Table 2. Horizontal ball movement between ball release and racquet-ball contact point

Type of serve	Competitive	Professional
FSW	−55	−15
FST	−75	−7
2W	−68	−25
2T	−84	−24
SS	−67	−25
KS	−79	−40

DISCUSSION

The aim of this study was to compare the toss of different types of serves between the competitive and the professional player from the point of view of the receiving player. Even though Crespo and Miley (2002) suggest that players should use the same toss for every serve to hide their intention. We observed this during the second serves of the professional. The professional player had lower variance of the flat serves racket-ball contact point (FST and FST) −6 cm (X) / 2 cm (Y). Otherwise the toss for the first serves varies widely between the players.

We presented some differences in toss execution. Carboch and Süss (2015) showed toss differences between the KS and the SS. They examined 10 players and found that

the racket-ball contact point of KS was 27 cm more to the right compared to SS when the players served from the ad-court. This supports the results for both players in our study (16 cm for the professional or 13 cm for the competitive player). Reid et al. (2011) observed 6 professional players (average ATP ranking 1539). They found no toss differences between FSW and FST; and between 2T and 2W (only 2 cm differences on the horizontal axis at the racket-ball contact point). We reached the same results only for the second serves of the professional (2T and 2W – 2 cm difference) or FSW and FST (6 cm difference). There are some contradictory results, as Reid et al. (2011) say that the players use the same toss. However, Carboch and Süss (2015) suggest that players do not use the same toss, even though both studies examined different type of serves. Surprisingly, our study suggests that observed players do not use the same toss for each type of serve (with the exception of the second serves and flat serves of the professional). However, similar findings were reported in a case study (Carboch, 2015), when the players served from the deuce court.

If we compare both players, we can see similar characteristics of the ball toss in some types of serves. For example, the KS toss trajectory was similar, and the racket-ball contact was mostly to the right from all the serves. However, we could observe individual differences in their own style of serve. The competitive player released the ball much more to the left. This is because of biomechanical factors and individual serve technique. This serving technique determines the serve execution, including the toss. The professional player reached a higher speed than the competitive player in all observed types of serves. The professional had similar average speed of all serves, like top professional tennis players, as shown by Vaverka (2010).

There were some limitations in this case study. We observed only two directions of serves – T and wide. Players may also serve into the middle of the service box – in the "body" direction of an opponent. Future research should include more participants in order to generalize the research.

CONCLUSION

We found differences in toss execution between the professional and the competitive player. The professional player used the same toss when he served FST and FSW; or 2T and 2W as well. There were differences in serve execution between serve types. The professional player varied more in serve toss execution (bigger range at racket-ball contact point of first serve), but not in the toss of the second serve. However, this study suggests that professional and competitive player did not use the same toss for each type of serve, since we could mostly see differences on the horizontal X axis. This means that receiving players can anticipate from the server's toss in some cases. Hence, tennis coaches should be more aware of this problem.

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SAILING ACROSS THE NORTH SEA: THE DEVELOPMENT OF TRUST IN A SHORT-TERM HIGH INTENSITY ENVIRONMENT

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ABSTRACT

Interpersonal trust among team members is an important phenomenon influencing working relationships and performance outcomes. However, there is a lack of empirical studies investigating the development of trust with respect to behavioural and environmental factors in a group of strangers. This exploratory, mixed method study investigated the development of two-dimensional interpersonal trust (affective and cognitive) and team cohesion in a newly formed temporary team of novice adults during a seven-day sail training programme. A descriptive longitudinal case study approach was adopted in the current study. Seven crew members completed the standardised psychometric questionnaires and were interviewed during the voyage. Results suggested that the development of trust occurs over three phases; 1) initial perception of shared identity, 2) early trust and 3) two dimensional trust comprising cognitive and affective dimensions. Distinct antecedents for the development of trust at each stage were identified and the importance of the competence-oriented subcomponent of cognitive trust within this challenging environmental context was highlighted. Exploratory interpretation suggests some overlap in the antecedents of interpersonal trust and team cohesion. However, further longitudinal research must examine this relationship and establish corroborative evidence for the model of trust. This research can impact on practitioners leading programmes to better understand how trust can develop over time, and offers a pragmatic approach to investigations in real world contexts.

INTRODUCTION

It is important to understand the development of interpersonal trust in small group dynamics because of its influence on developing effective working relationships (e.g. Costa, Roe, & Taillieu, 2001), team cohesion (e.g. Hansen, Morrow, & Batista, 2002),

successful team performance in both sport and organizational teams (e.g. Dirsk, 2000), trust-based decision-making (e.g. Evans & Krueger, 2014), and even conflict resolution (e.g. Mooney, Holahan, & Amason, 2007). Interpersonal trust among team members has been shown to have a mediating effect between team cohesion and team performance (Mach, Dolan, & Tzafrir, 2010). Moreover, Lau and Liden (2008) found that poorly performing teams had more trust in their formal leaders compared to well performing teams. Even though this finding is counterintuitive, it has been explained with respect to vulnerability when performing poorly and higher self-confidence among well performing team members (Lau & Liden, 2008).

Definition of Trust

There are two principal forms of interpersonal trust, although some previous studies have examined trust as a one-dimensional construct (e.g. Mach et al., 2010; Mayer, Davis, & Schoorman, 1995) or sought for a mathematical expression of trust (e.g. Bhattacharya, Devinney, & Pillutla, 1998). According to McAllister (1995), interpersonal trust can be either affect- or cognition-based. Affective trust develops through interpersonal care and concern, and cognitive trust develops through beliefs in others' credibility and reliability. It is worth mentioning that Mayer et al. (1995) developed a similar model of trust based on early trust literature. They argued that the perceived trustworthiness of a trustee will influence the development of trust where trustworthiness has three variables: ability, benevolence and integrity. The authors emphasized that, although these three factors are interrelated, they can be separated in their one-dimensional model and will be highly affected by the environmental factors and the perceived risk of developing trust. This suggests the relevance of a two-dimensional model, such as that developed by McAllister (1995) where ability is an antecedent for cognitive-trust and benevolence is an antecedent of affective-trust. Similarly, Bhattacharya et al. (1998) concluded that trust "is a multidimensional statistical construct" (p. 468).

The two-dimensions of trust also show great application to other interpersonal variables in the group dynamics literature such as conflict management (e.g. Mooney, Holahan, & Amason, 2007) or team cohesion (e.g. Fung, 2014). Within team cohesion literature, where cohesion is separated into task cohesion (i.e., to what extend the team members work together to achieve mutual goals) and social cohesion (i.e., to what extend the team members develop and maintain social relationships within a group; Carron, Widmeyer, & Brawley, 1985), trust has been found to be an important variable in developing both task and social cohesion (e.g. Brahm & Kunze, 2011). Moreover, Mach et al. (2010) found trust to have a mediating effect between team cohesion and team performance. Similarly, team building activities designed to enhance social cohesion among team members and encourage mutual sharing and open discussion have shown a positive effect on the development of trust in other team members (Hansen et al., 2002; Pain & Harwood, 2009), even though the constructs of trust were not looked at in more detail. Likewise, Jirasek and Dvorackova (2016) found increased team cohesion and strengthened relationships among the participants of the 12-day residential winter journey on snowshoes.

Antecedents of Trust

According to McAllister (1995), affective trust and cognitive trust have different antecedents. He tested his conceptualized two-dimensional model on small teams formed from 197 previously known peers, in a work context. Through questionnaire responses, participants reported on levels of cognitive and affective trust as well as on relevant behaviours, broadly described as either cooperating behaviours, such as doing additional work for others without being asked (i.e., affiliative citizenship) or defensive behaviours, such as working around someone or keeping track of others' work. Results indicated different antecedents for the two dimensions. Specifically, cooperative behaviours, or affiliative citizenship, was found to be positively related to affect-based trust; whilst defensive behaviours were found to be not significantly related to cognitive trust. McAllister (1995) also found a higher overall level of cognitive than affective trust and suggested that affect-based trust is harder to develop and can be developed only if some cognition-based trust is present. However, the sample comprised 75% of highly educated men (average age 38 years), which is not representative of the general population. Moreover, a cross-sectional study design does not allow causal inferences to be made.

Webber (2008) used a longitudinal study to research the development of early, affective and cognitive trust over the course of 10 weeks with respect to citizenship and monitoring behaviours, and team performance. 279 undergraduate students forming teams of 3–4 people completed the Trust Scale (McAllister, 1995) adjusted to a university context. All groups were given an assessed group tutorial task to complete over 10 weeks and the final grade was used as a team performance measure. Webber (2008) found that citizenship behaviours shown at Week 5 positively correlated with affect-based trust developed at Week 10. Monitoring behaviours demonstrated at Week 5 negatively correlated with cognition-based trust developed at Week 10. Affective trust and cognitive trust were found to be statistically significantly correlated at Week 10 ($r = 0.64$, $p < 0.01$) where the degree of shared variance also indicates some unique variance (or separation). Importantly, the author noted that one-dimensional early trust preceded the formation of two-dimensional trust. It should be noted that the groups in Webber's (2008) study were formed by the participants themselves, which presents a potential confound, since participants were likely to show selection bias based on friendships and prior knowledge of others' credibility. Whilst this study has good ecological validity in this setting, where students are often able to self-select project groups, it may not accurately represent the development and impact of trust in newly formed or temporary teams which are often found in organizational or sporting settings.

Developing Trust within Different Settings

According to Mayer et al. (1995), the perceived risk of developing trust among people is highly affected by the environment. A number of researchers examined trust within temporary teams, mostly within organizational settings (e.g. Meyerson, Weick, & Kramer, 1996). However, there is still little evidence about the development of trust outside organizational or managerial settings (Mayer et al., 1995). Even though some researchers looked at trust within sport settings (e.g. Hacket, 2014), they failed to examine either

different dimensions of trust (e.g. Zhang, 2004) or the effects of different antecedents on its development (e.g. Dunn & Holt, 2004). Furthermore, there have been some attempts to investigate trust within outdoor education programmes. Shooter, Sibthrop and Gookin (2010) examined the relationship between trust developed in the programme leaders and skills developed by the participants by conducting a course quality survey at the end of the outdoor education programme. Even though Shooter and colleagues followed Mayer et al.'s (1995) conceptual framework, the researchers did not examine what behaviours and outcomes were expressed by the leaders to enable the development of trust, and to what extent trust was developed. Moreover, the cross-sectional design of the study and reliance on self-reported measures does not allow for causal conclusions to be drawn.

It should be noted that outdoor education programmes (especially residential experiences such as hiking, sailing or overseas expeditions) facilitate the conditions in which trust is likely to change over the course of programme, along with other group dynamics factors (Sibthorp & Jostad, 2014), due to specific and sometimes risky situations, and the need to quickly develop essential skills and knowledge to achieve mutual goals. One such environment is sail training, which deliberately aims to provide supportive interactions with others and opportunities to develop mutual trust (Von Wald & Allison, 2011). This can create a positive environment on board for the development of two-dimensional trust. As pointed out by Mayer et al. (1995) and later highlighted by Bhattacharya et al. (1998), the perception of uncertainty and risk of the sailing context will influence the need for, and the importance of, the development of trust and trustworthiness in others.

Emerging Gaps and the Current Study

Various authors have identified four main drawbacks of the current trust literature. First, there is no clear understanding of how trust is developed over time, due to over-reliance on cross-sectional designs and under-representation of longitudinal studies (e.g. Lusher, Kremer, & Robins, 2014; Mach et al., 2010; McAllister, 1995). Second, many studies have relied on quantitative approaches (e.g. Lau & Liden, 2008; McAllister, 1995; Shooter et al., 2010) which restricts the scope of investigations to easily comprehend complex relationships within and between constructs of trust and team cohesion, including the effects of different factors such as prior familiarity among the participants (Webber, 2008). Third, Mayer et al. (1995) pointed out the limited applications of their model outside the organizational environment, which is also true for McAllister's (1995) work. Overall, most of the existing empirical studies on trust have been conducted within organizational settings, limiting their application into other environments. Last, Lusher et al. (2004) emphasized the need for future research to investigate the relationships between various factors influencing team performance, including team cohesion and trust among team members. Even though some studies of this nature have been conducted in the past, detailed investigations between different variables of these constructs (i.e., team cohesion and two-dimensional trust) have received little attention to date.

These gaps suggest that further research in a variety of real world settings, beyond organizations, and especially where trust development is salient, such as outdoor education programmes, can significantly contribute to understanding how interpersonal trust is developed as well as its relationship with cohesion. Despite some clear benefits,

longitudinal research in real world contexts has specific difficulties including: access, commitment of participants over prolonged periods, high research time cost, low context control and representativeness. Traditional research paradigms often do not fit well with such research contexts because basic assumptions are compromised. However, a pragmatic research philosophy, using mixed methods, is less prescriptive and can underpin research decisions that attempt to solve the problem of how to ask meaningful questions in complex, time pressured and challenging settings (Giacobbi, Poczwardowski, & Hager, 2005). Using a pragmatic approach, researchers are encouraged to select the best methods to collect data within the parameters of the research context and to put aside epistemological differences in the pursuit of answering applied research questions.

Therefore the current study was formulated from a pragmatic research philosophy, to use mixed methods to investigate the development of cognitive and affective trust and team cohesion, over time, in a group of novice adults undertaking a seven-day sail training programme. Two specific research questions were: in what way does reported two-dimensional trust and team cohesion change over time, and why? And: what might be the nature of the relationship between two-dimensional trust and team cohesion over time?

METHODS

A longitudinal descriptive case study design was adopted in this study to investigate the research questions. This was deemed appropriate following the suggestions made by Webber (2008) and insights presented by Mayer et al. (1995) in their literature review on factors needed to develop trust.

Participants

A convenience sample of seven people, hereafter referred to as 'crew', (mean age = 24.71 years, SD = 6.70) taking part in a seven-day sail training programme across the North Sea from UK to Germany, agreed to participate in this study. One participant dropped out after Day 2 (due to seasickness), resulting in a final sample of five men (mean age = 25 years, SD = 7.91) and one woman (age = 21). In line with recommendations for establishing validity within pragmatic research (Giacobbi et al., 2005) details of the participants, including relevant experiences and prior familiarity, are shown in Table 1.

Table 1. Participants Demographic Information

Pseudonym	Gender	Age (years)	Sailing Experience (years)	Prior Familiarity with	Context
Rose	F	21	15	Scott	University Sailing Club
Scott	M	21	3	Rose	University Sailing Club
Gregor	M	18	0		
David	M	20	4		
Adam	M	37	0		
Ben	M	29	0	Watch leader	Work place

Materials

Questionnaires. Cohesion was assessed via the Group Environment Questionnaire (GEQ; Carron et al., 1985). The GEQ comprises 18 items that measure social and task cohesion (9 items each). Trust was assessed using the Trust Scale (McAllister, 1995) comprising 15 items that measure affect-based trust (5 items), cognition-based trust (4 items), affiliative citizenship behaviour (3 items), and assistance-oriented citizenship behaviour (3 items) among crew members. The last seven items measure affect-based trust (4 items) and cognition-based trust (3 items) in sea staff members as perceived by a crew member. All items were assessed on a nine-point Likert scale (1 *strongly disagree* and 9 *strongly agree*) and were adjusted to the sailing environment (e.g. original item: *I take time to listen to this person's problems and worries*; modified item: *I take time to listen to other team members' problems and worries*). After piloting the questionnaire, additional minor changes in wording were made to increase contextual relevance.

    Interviews. An interview schedule for semi-structured interviews was developed, based on a review of the 'trust' literature. The questions were focused on individual perceptions of the development of trust and team cohesion among crew members, including the importance of various factors and the environment itself (McAllister, 1995; Mayer et al., 1995; Webber, 2008). The interview schedule was piloted using a participant from a youth development sailing programme. Consequently, questions about helping behaviours on board were added, and questions about sea staff members were separated into questions about a skipper and other sea staff members.

    Observations. Observations were recorded using an adapted observation record sheet (Allison, McCulloch, McLaughlin, Edwards, & Tett, 2007) by the first author. Observational data were supported by a reflective diary used to record researcher's holistic reflections during the voyage, following Woodcock, Richards and Mugford (2008).

    Social validation. A post-study focus group lasting for approximately 20 minutes was conducted with all participants. It was conducted in an open and semi-structured manner, and included questions about changes in natural behaviour and group dynamics due to repeated measures and researcher's presence on board (e.g. *Were you more aware / did you expect certain behaviours on board after completing a questionnaire?*).

Procedure

Ethical approval was obtained from the Ethics Committee at The University of Edinburgh. All participants were given information about this study one week prior to departure and were invited to take part in this study through a signed informed consent, within one hour of arriving on board.

    All participants completed the questionnaire four times in total, on Days 1, 3, 5 and 7. Each participant was interviewed once during the last three days (see Figure 1). Each interview lasted approximately 20 minutes on average and was recorded for later transcription. The observations of life on board, group dynamics and behavioural responses were made, on average, four times a day during the voyage.
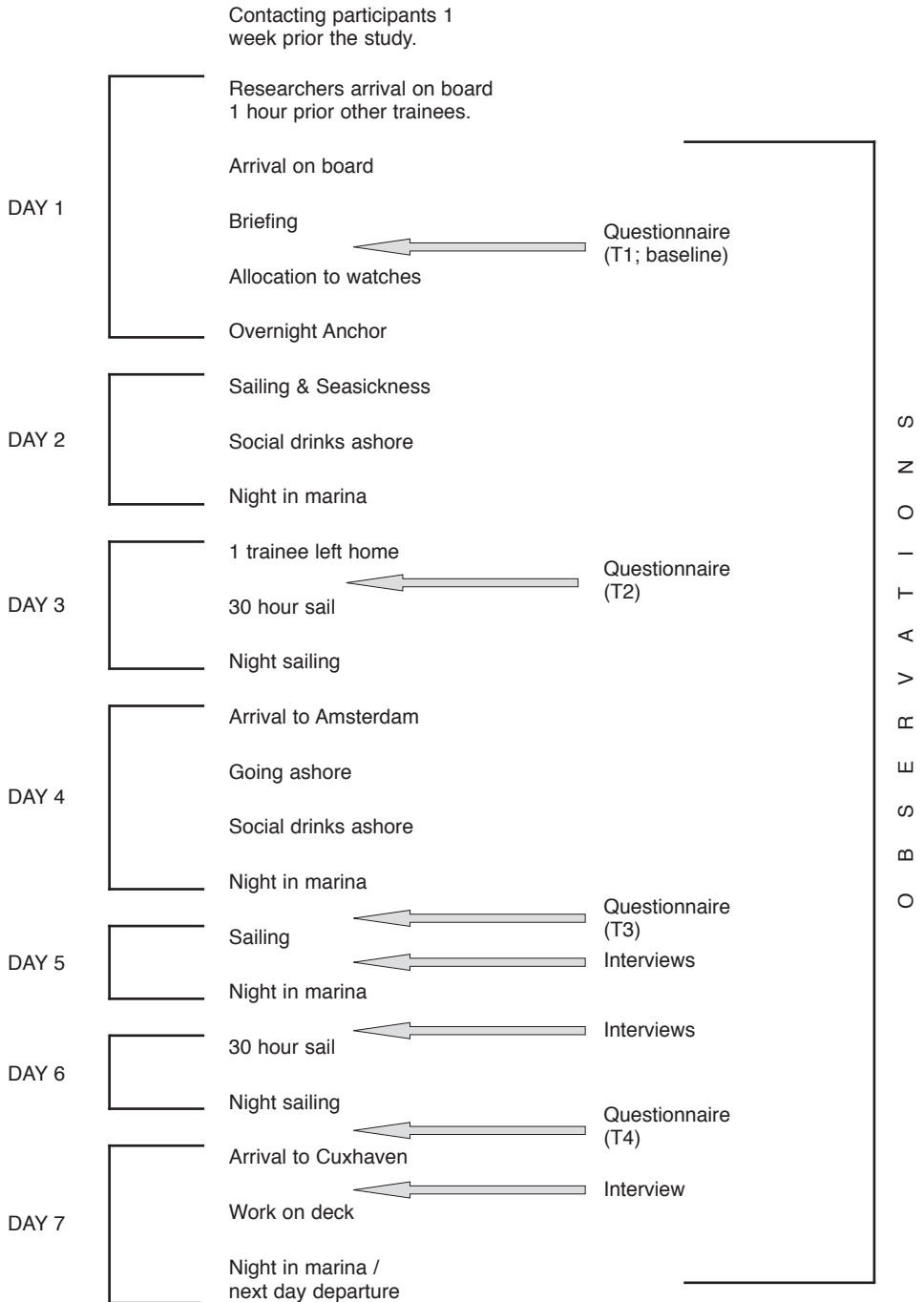
Figure 1. Procedure of the study with respect to the main events that happened on board

Analysis

All interviews were recorded and later transcribed. A short summary of each transcript was sent to each participant one week after the voyage which provided the opportunity to correct for immediate errors in the researcher's interpretation, as well as to add additional information (i.e., member check; Stake, 1995). All participants agreed with the summaries and one participant added additional information on perceived affective trust in crew members and influencing factors.

Second, content analysis was used to analyse transcripts. First, the broad themes (or categories) were identified from the interview schedule (e.g. early trust, cognitive trust; Julien, 2008). Next, each transcript was coded into meaningful units and categorised and sub-categorised under the previously identified themes (e.g. a category *getting to know each other* within *affective trust among trainees* theme).

Third, a consensus validation process was used to enhance trustworthiness of analysis, minimise researcher's bias and increase the credibility of findings (Hodge, Ammah, Casebolt, Lamaster, & O'Sullivan, 2010; Jones & Hunter, 1995). A sample of 40% of meaningful units was selected and the second author coded these to the named categories. After the consensus validation exercise, the first and second authors recorded 80% agreement. Following discussion, 36% of the disagreement was resolved, 18% per cent by shifting the perception of the first author, and 46% by merging three categories together.

Visual inspection of quantitative data (Kratochwill et al., 2010) was used to examine the development of both cognitive and affective trust and team cohesion over time. This approach has been suggested as a suitable alternative to inferential statistics in single-case time design (Pain & Harwood, 2009). Data was extracted from the questionnaires to plot the graphs. The mean averages were calculated for trust and cohesion using the scoring procedures described by McAllister (1995) and Carron et al. (1985) respectively. It should be noted that mean average rather than sum was used for calculating GEQ scores to make easier visual examination between trust and cohesion.

Observation data and field notes were used to support the interviews and to clarify the events during the visual inspection of data.

Field Work

The current study was conducted on a 72-foot yacht *John Laing* with a total of 14 people at the beginning of the voyage (i.e., six professional sea staff members and eight crew members including the researcher). All participants were randomly divided into two watch teams (i.e., two watches) by the skipper within the first two hours on board. Each watch was assigned a staff member as watch leader. Both teams followed a four hours on and four hours off schedule to divide all work.

There were three cabins for sea staff and one mutual bunk area for the rest of the crew (see Ocean Youth Trust South (2006): http://www.oytsouth.org/about-our-boat.asp for more details about the boat). *John Laing* also has a galley (kitchen), heads (toilets) and saloon (common area) there the crew eats and spends free time when off duty. During the periods of free time, the off watch would either rest in their bunks, stay in the cockpit or gather around the table in the saloon to socialise. If more hands were needed on board (e.g. coming into

port) or if training was taking place (e.g. a man over board), the whole crew was required to stay in the cockpit. During the episode of seasickness on Day 2, everyone who avoided or could cope with seasickness was working on board regardless of the established schedule to allow others to recover. The entire complement lived on board for seven days including one overnight anchoring, two overnight passages and three nights in harbour.

The researcher who undertook participant-as-researcher role (Gold, 1958) lived in the same bunk with other crew members from the beginning to the end of the voyage. All participants were aware of the researcher's role, full participation in all activities, and formal and informal observations (Gold, 1958; Pratt, 2009). This helped to achieve prolonged engagement with participants which allowed the researcher to build rapport with the participants (Hong & Duff, 2002; Shenton, 2010) and to enhance the quality of findings.

RESULTS AND DISCUSSION

This section will report findings on early trust, the development of cognitive and affective trust, and team cohesion. The excerpts from interview transcripts are compared against quantitative data and used to illustrate the arguments, which are further discussed with relation to literature. It should be noted that the interview excerpts are the main source of data. Gender representative pseudonyms are used to protect the confidentiality of data and to give a sense of ownership (see Table 1). The reader is asked to consider these results in relation to context of sail training, which requires technical knowledge and specific skills and where some situations can be life threatening. Moreover, the reader is reminded that the entire crew lived and worked in close physical proximity, had 24/7 contact with each other and were mostly unfamiliar with sailing prior the study.

Early Trust and Previous Familiarity

One participant was familiar with a sea staff member from work which resulted in higher early trust in this sea staff member compared to others. The basis for early trust included sailing experience and being good at sailing, "I knew she was doing it for long and she was quite good at it" (Ben). It also was a mediator in early trust in other sea staff members, "Initially she was doing it with some of these other people before, so that extended the trust to other sea staff members" (Ben). This is in line with Webber (2008) who found that previous familiarity resulted in higher early trust. This finding is also consistent with Lusher et al. (2014) who found the positive effect of transitive closure on trust among football team players. That is, if player A trusted player B who trusted player C, player A will also trust player C.

Even though another two participants were fairly familiar with each other, it did not result in higher early trust between them. When asked if Scott trusted Rose more than others because of their previous familiarity, Scott answered "No, because she crashed our J24 [a yacht]" (Scott). Whilst previous familiarity results in higher early trust which is in line with both Aubert and Kelsey (2003) and Webber (2008), the outcome and context of prior familiarity is more important. This finding supports the suggestions made by Mayer et al. (1995) and Bhattacharya et al. (1998) that the outcomes of behaviour will affect the development of trust. Moreover, as found by Erdem and Ozen (2003) making mistakes

will negatively influence the development of cognitive trust as it implies lower ability levels. Therefore, prior familiarity was not linearly correlated with the development of trust. It rather helped to make clearer decisions whether a person should be trusted based on the outcomes of past experience.

The Development of Two-Dimensional Trust

Cognitive Trust. From the interview data, three main reasons emerged influencing the development of cognitive trust among crew members.

First, *getting to know others' skills and competence* mainly through observation was mentioned by six participants: "Scott with the sails seems to be very in 'the know' what ropes to pull and all that puts a lot of trust. He can tell you what to do" (Gregor). This finding partially supports Webber (2008) who argued that previous familiarity influenced early trust. In this situation, familiarity with skills and technical competences one possesses influenced the development of cognitive trust over time. Moreover, Webber argued that monitoring behaviours such as observation have a negative influence on the development of cognitive trust, which was not supported in this study given a successful outcome. The outcome of the behaviour (successful in this case) was more important in developing cognitive trust, which is in line with Mayer et al. (1995) and Bhattacharya et al. (1998). Importantly, this findings supports Mayer et al.'s (1995) claims that ability is one of the important factors in developing trust and that it is domain specific.

The importance of *spending time together* on a professional basis was indicated by four participants. Rose explained that "Well, as we are separated into two watches, you spend more time with one watch than you do with another". This is not consistent with McAllister (1995) who suggested that interaction frequency and citizenship behaviours influence only affective trust. This finding, however, can be viewed in line with Bhattacharya et al. (1998), as spending time together will give an opportunity to see the actions of other people, and the outcomes and the consequences of those actions.

Finally, *forced dependence on each other* was identified by two participants: "You have to depend on them, you have to depend on everybody around you" (Adam). Forced dependence was facilitated by context, which is in line with Mayer et al.'s (1995) argument that the need to trust other people is partially determined by contextual factors. Hence, cognitive trust based on a member's ability to perform a task was developed quickly, as it was by the nature of the domain and the activity itself.

One main reason emerged affecting the development of cognitive trust in *sea staff members*, i.e. monitoring behaviour. The skipper proved his qualifications and skills by being able to make quick decisions, being aware of the situation, and being able to switch leadership styles (6 participants). Rose said "he took charge, went for it, took the helm and did it his way". As observed and recorded by the researcher, this change happened in an emergency situation where the skipper had to step in, take the helm and be authoritarian compared to his more democratic style in a planned situation. Other sea staff members also proved their competence and ability (5 participants): "I had a lot of trust in them anyway. Just backed it up" (Gregor). However, one participant had decreased cognitive trust in one particular sea staff member: "He [a sea staff member] gets some basic things wrong and has to be corrected by [another sea staff member] or sometimes by one of us" (Scott).

Whilst this finding is consistent with both Webber (2008) and Erdem and Ozen (2003), as observed mistakes were perceived negatively, thus influencing cognitive trust, the observed successful outcomes were perceived as positively influencing cognitive trust. This finding is in line with Lusher et al. (2014) who found that team players high in experience or successful performance are more likely to be trusted by other team members. Hence, the outcome and the consequences of specific actions were the most important factors to develop cognitive trust based on ability as previously suggested by both Bhattacharya et al. (1998) and Mayer et al. (1995). Moreover, it also supports Meyerson et al.'s (1996) notion of 'swift trust', where early trust is assumed in the temporary teams and then later confirmed. In the current scenario, the assumed early cognitive trust in the skipper was later confirmed, whereas the assumed early cognitive trust in another less experienced sea staff member was later denied resulting in decreased cognitive trust later on.

Affective Trust. There were five main reasons influencing the development of affective trust. First, all participants *got to know each other's character* during difficult time on board (e.g. seasickness), "They showed some character because when they're really ill, they can still pick themselves up and carry on" (Rose). This finding is not consistent with McAllister (1995) who argued that monitoring behaviours did not influence affective trust.

Looking after each other also facilitated the development of affective trust (5 participants), "If people aren't well, as we have seen, we all look after each other" (David). This finding is consistent with McAllister (1995), who found a positive influence of affiliative citizenship on affective trust. This finding can also be viewed in terms of benevolence in Mayer et al.'s (1995) model as a pre-requisite to the development of affective trust.

Personal disclosure was mentioned by three participants. When asked about trusting other crew members on emotional level, Adam answered: "There are some people you would open up to, some people you wouldn't." Whilst this finding is consistent with both Dunn and Holt (2004) and Pain and Harwood (2009), the latter argued that personal disclosure is more effective in professional rather than amateur sport. However, amateur sailors were keen on personal disclosure which was a natural step in developing friendships rather than a compulsory part of a team building intervention, as in Dunn and Holt's (2004) study.

Going ashore together was perceived as a good opportunity to socialise by two participants. When asked to what extent going ashore had influenced trust, Ben answered: "A bit. It is always useful to travel with people socially. Another level of personal connection that you don't get at work."

Finally, *spending time together* on different occasions facilitated affective trust among crew members (2 participants) and in sea staff members (4 participants): "Some were little bit edgy to begin with. […] Things have changed as they've got to know us, and we've got to know them" (Rose). This finding is consistent with both Webber (2008) who argued that taking a personal interest in other people positively influences affective trust and McAllister (1995) who found the positive effect of interaction frequency on affective trust.

After visual examination of quantitative data, affective trust among crew members gradually increased over seven days following the same pattern as cognitive trust. The biggest increase in both cognitive (i.e. 25.33%) and affective trust (i.e. 23.51%) was during the first two days of sailing, with their peaks at Day 5, i.e. after crossing the North Sea (see Figure 2). This finding is consistent with Webber (2008) who also found increased levels of trust develop over time.

Whilst cognitive trust was lower than affective trust among crew members, affective trust in sea staff members was lower than cognitive trust in sea staff members during the voyage (see Figure 3). The latter finding partially supports McAllister (1995), who argued that some level of cognitive trust is needed for affective trust to be developed. However, the latter finding confirms the earlier findings that more cognitive trust was assumed in sea staff members prior the voyage as they were expected to be experienced professionals. Within the crew members, the reverse pattern was observed as the crew was expected to be inexperienced in sailing but sharing the same hobby which caused higher initial levels of affective trust rather than cognitive. This is partially in line with Meyerson et al. (1996), as in temporary teams some trust has to be assumed initially with later confirmation. Nevertheless, the given circumstances and existing information will determine whether it is cognitive or affective trust which can vary from one team member to another one.
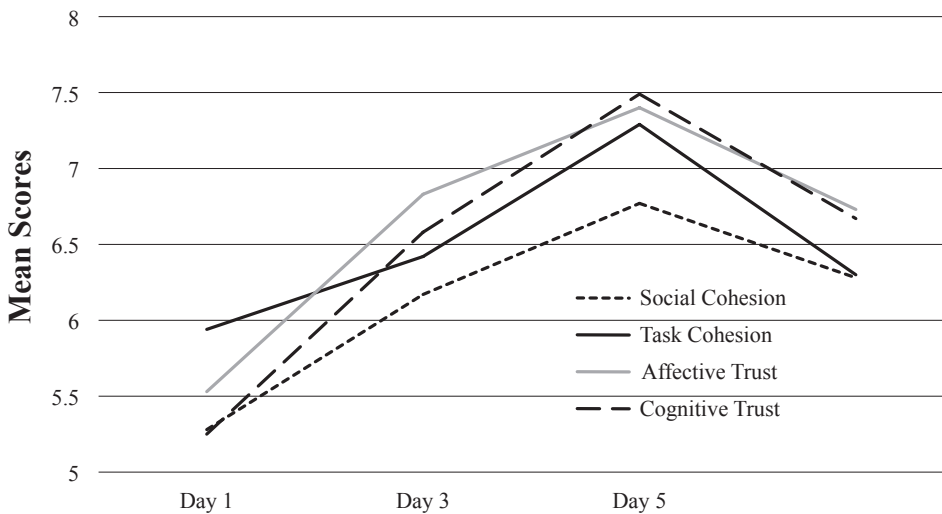
Figure 2. The development of two-dimensional trust and cohesion among crew members over time
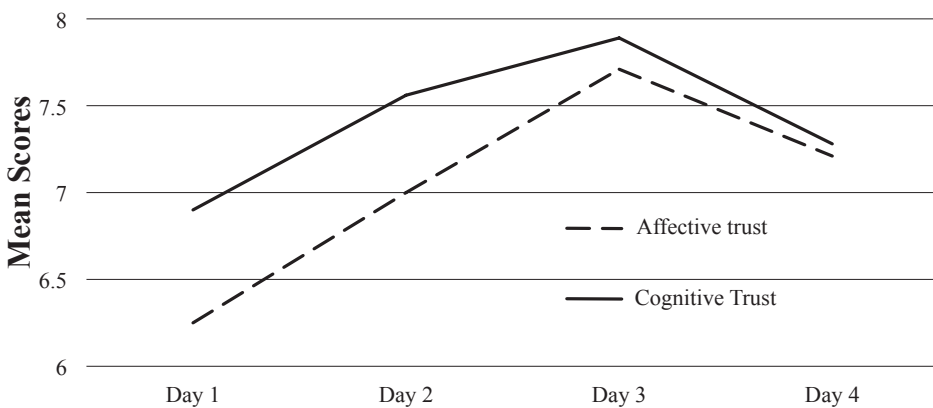
Figure 3. The development of two-dimensional trust in sea staff members over time

The Development of Team Cohesion

The analysis of interview data identified five reasons influencing a change in team cohesion that were all broadly connected to knowledge and understanding of, and about, others.

Three participants mentioned *getting to know each other*: "So in the start you're all strangers, you don't know each other, by the end of this you're pretty good friends" (Gregor). *Working together* was identified by two participants: "Well, at the beginning of a week we didn't know each other, we were individual people and now you work well as a team" (David). *Spending time together* was perceived important by three participants: "And obviously going out when we are getting into the port. You get to know people. We've come a lot closer" (Gregor). *Getting to know skills and competence* was mentioned by two participants: "They are all strangers, you don't know what their skill sets are, what they are good at. By the end, where we are now, you know what everybody can do" (David). Finally, *helping each other* was mentioned by one participant: "Even though it is one team's watch, the other team has often come up to help [team cohesion]" (Adam).

Based on quantitative data, team cohesion gradually increased during the first five days, during which the crew crossed the North Sea and spent time ashore in Amsterdam. This finding is consistent with data obtained from the interviews, as three out of six participants identified the North Sea crossing as the point of "the transformation" (Scott). Task cohesion had the highest increase between Day 3 and Day 5 (from 6.42 to 7.29 = 13.55%) during which the North Sea crossing happened. Social cohesion had the biggest increase between Day 1 and Day 3 (from 5.28 to 6.17 = 16.86%), i.e. during the first two full days on board that might logically be associated with quickly getting to know others (see Figure 2).

These findings are in line with Glass and Benshoff (2002) who found that outdoor challenge experiences positively influenced the development of team cohesion. It should be noted that task cohesion, in general, was higher than social cohesion during the voyage. This finding suggests that task cohesion in novices can developed via teamwork and mutual learning. Moreover, the temporarily formed crew did not have enough opportunities or did not have enough motivation to develop and maintain social relationships outside work, as the crew would never come together after the voyage was finished. The former was noted by Scott who thought that team cohesiveness is highlighted by "being ashore and still sticking together as opposed to being on the boat where you have to stick together regardless".

On the other hand, perceived team cohesion dramatically dropped after Day 5 (see Figure 2) which contradicts Jirasek and Dvorackova's (2016) findings. There are two main reasons that could explain this phenomenon. First, participants were experiencing physical and mental fatigue on the final day of the voyage, caused by the nature of the final leg (i.e., 30 hours sail; see Figure 1) and by the design of the study (4 measures in 7 days). Secondly, the final measure was obtained *after* reaching the final destination, which meant that there was no need to maintain high cohesiveness among the crew, as the team goals were achieved and the crew would leave home shortly with little possibility to meet again.

Overall, the development of team cohesion was affected by similar factors to those that influenced the development of two-dimensional trust. This evidence supports existing knowledge that trust and cohesion are closely related and one influences the other (e.g. Mach et al., 2010). In particular, affective trust and social cohesion were perceived as closely related, implying the close relationship between these two phenomena. Moreover, social cohesion was developed through assistance-oriented behaviours and affiliative citizenship suggesting the same antecedents of affective trust and social cohesion. Furthermore, team cohesion was perceived as a result of a more trusting team suggesting that the development of interpersonal trust may be a precursor to the development of team cohesion, a view that is consistent with Erdem and Ozen's (2003) suggestions. In other words, people have to get to know each other first and to be familiar with each other's skills and competencies before social and task cohesion can be developed.

General Discussion

The findings of the current study support the idea of the three-step development of trust: initial perception of shared identity (or swift trust in temporary teams), to early trust, to affective and/or cognitive trust in newly formed teams. This conclusion partially confirms both Meyerson et al. (1996), who proposed the idea of swift trust in temporary teams, and Webber (2008), who investigated one-dimensional early trust in her study. Donnelly and Young (1988) proposed a four-step formation of a group which begins with presocialization and then goes through selection and recruitment, socialization, and acceptance or ostracism. The presocialization stage is based on gathering information about the activity, enrolling, paying money and physically arriving to the first session. The perception of shared identity gives some level of trust among people who have never met before, but came together for the same reasons. In the current study participants came on board with some levels of trust based on perceived shared identity, as everyone was interested in sailing and had to go through the same process to be there. One-dimensional early trust was developed next, as participants introduced each other and started working in their teams. In the sail training environment, two-dimensional trust developed shortly after the early trust stage, although some people developed higher affective than cognitive trust in other crew members. This suggests that in some environments and circumstances two-dimensional trust is very difficult to develop, due to a lack of interaction on a professional or social basis, low intensity, etc.

The current findings confirm the importance of context-specific ability when developing cognitive trust and various forms of benevolence when developing affective trust. Moreover, the development of all forms of trust is highly dependent on the outcomes of specific situations and behaviours that will influence what form of trust, if any, will be developed first: cognitive or affective. It is also anticipated that whilst team cohesion and interpersonal trust were found to be closely related by having overlapping antecedents, team cohesion was likely to be a by-product of more trusting temporary team members.

Limitations

There are several limitations in this study that are relevant for future research as well as allowing a balanced interpretation of findings. First, the nature of the environment and

the small number of participants restricts the ability to make broad generalisations. To address this partially, a thick and detailed description of the social and physical context was provided to increase the naturalistic generalisability of current findings (Shenton, 2010). Applying questionnaires to small sample sizes or single subjects follows a long-accepted approach in sport psychology (e.g. Barker & Jones, 2006; Mahoney & Avener, 1977). In doing this it is important not to mislead the reader or apply inferential statistics to make broad generalisations from the data, and so we have explicitly drawn attention to the limits of the study and provided specific implications from the data. Second, convenience sampling inherent in field research did not allow age, gender, previous familiarity and sailing skills to be controlled for. The planned time of measurements had to be adjusted with respect to events happening on board, taking into account time demands. As such, the possibility of physical and mental fatigue towards the end of the study may have a confounding effect on the last measurements obtained. However, the naturalistic setting of this study has provided a better understanding of the environmental and behavioural factors influencing the development of cognitive and affective trust and task and social cohesion. Finally, the participants were constantly prompted about the study and group dynamics with the questionnaire, which presents a potential confound to the natural group dynamics within the crew.

Future Research

Tracking change over time is an important feature for future research to concentrate on in order to investigate the development of two-dimensional trust. It is also important to compare findings from other technical environments with similar intensity (e.g. adventure sports) to examine further how environmental factors and perceived risk affect the development of trust and team cohesion. Future research should clearly identify a type of team which is of interest: temporary, newly formed or existing. Taking into consideration quickly evolving technologies, the same principles of developing trust should be applied and examined into virtual teams, too. By investigating different types of teams within different environments, a deeper understanding of initial (or swift trust in temporary teams), early, cognitive, and affective trust and their antecedents could be achieved. It would provide a better understanding of the circumstances under which different types of trust are likely to be developed by tracking the antecedents of trust longitudinally using structural equation modelling. Additionally, there is a lack of qualitative longitudinal studies examining the development of trust, that could be used for the refinement of quantitative measurements of interpersonal trust within different environments. Finally, the mediating effect of previous familiarity among the team members should be further investigated to understand better the factors influencing the development of trust.

Implications for Professional Practice

The results of the current study could be practically applied to various professional settings (e.g. sport, business or academia). First, managers and formal leaders of the teams should be aware of their capacity to influence cognitive trust formation among followers, especially in new team members. This can be both direct and

indirect by influencing conditions and context to deliberately foster key behaviours. As such, formal leaders should provide some supervision for newcomers to foster the development of trustworthiness in their skills and abilities among other team members. Additionally, team members should be made aware of the influence of the citizenship and observing behaviours in developing two-dimensional trust with their peers. Observing behaviour is particularly influential in newly formed teams within specific contexts (e.g. sports teams including national squads), where team members are not familiar with each other's competencies and abilities. Furthermore, team leaders should foster personal disclosure among team members by organizing activities and creating a context that facilitates the development of both affective trust and social cohesion. As such, more socially cohesive teams would perceive the work environment to be more relaxed, honest and pleasant, which would increase job satisfaction and performance outcomes (e.g. Braun, Peus, Weisweiler, & Frey, 2013). Finally, making the leaders and team members aware of the multifaceted nature of trust and the relationship between trust and other factors in group dynamics would help to differentiate between different behaviours, levels and types of trust, which would help to resolve possible conflict occurring on and off the pitch.

CONCLUSION

This study focused on gaining insight into the development of two-dimensional trust over time by adopting a mixed method approach. It sought to examine different antecedents of two-dimensional trust developed over time in an intense and often risky environment. Data collected during a seven-day voyage provided a deeper understanding of the impact of environmental and behavioural factors on the development of cognitive and affective trust in a temporary team of amateur sailors. The findings from this study lead us to propose that neither cognitive nor affective trust develops straight away, but rather via initial uni-dimensional stages, i.e. initial perception of shared identity (or swift trust in temporary teams), to early trust, to affective and/or cognitive trust. Depending on the given circumstances, the initial perceptions of shared identity and early trust may have either cognitive or affective basis for its development. Depending on the given environment, cognitive trust is not necessarily a prerequisite for affective trust to be developed. Instead, it could be developed even more slowly than affective trust. As expected, cognitive trust was closely related to a level of perceived ability and competence relevant to the context. Trust was also identified as a prerequisite for team cohesion to develop where cognitive trust was associated with smooth teamwork and affective trust was associated with social cohesion. The fine line between the latter two constructs was identified during the interviews.

The current study indicated that environmental and behavioural factors influence the development of interpersonal trust and team cohesion, and that these two are interconnected during short but intense periods of time. Further studies should be conducted to investigate the dynamic development of trust and cohesion and to strengthen research approaches to redress weaknesses that exists in the current literature.

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SHIPWRECK IN THE ROWING COMMUNITY IN 1902: REFLECTIONS ON LIFE AND DEATH IN SPORT

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ABSTRACT

People usually start thinking about death when something tragic happens, including in the sport context. At the beginning of 20th century, in South Brazil, four rowers died while they practiced their sport, coming back from an excursion to an island near to Porto Alegre, the capital city of Rio Grande do Sul, where they lived. Following the tragedy, the newspapers published details, both of the tragedy itself, and the ensuing commotion of society, with reflections about life, its fragility and death. This sporting tragedy is a suitable example for trying to understand the way we think about death in sport, given its vast newspaper coverage and the effort to remember the event throughout the 20th century. The interpretation of newspaper sources and reflections on the event will also be considered through the lens of the philosophy of existence of Martin Heidegger. The sources revealed that the shipwreck tragedy made it possible for people to realize that being mortal affects us existentially – that we can never return back to this moment (it is fleeting, it is here and then gone), that we have to make choices that we cannot take back, and that we ourselves are finite beings.

Keywords: sport; history; philosophy of existence; Heidegger; death; rowing; swimming

INTRODUCTION

Sport is often considered to be a practice which helps to highlight human activity, striving to be better, and as such it celebrates life and promotes health. It is associated with healthy, strong and enthusiastic people, full of life. However, when an athlete dies during a sport event or sport training, such a tragedy may change the way we see the whole practice. This may cause various reactions, and people may start thinking about life, dying and death in relation to their own lives. Consider the case of Ayrton Senna in Formula 1 in 1994, who died after an accident during a competition in the San Marino

Grand Prix in Ímola (Italy), an event that touched people around the world. For the purpose of this article, we take a case in the year 1902, after the sinking of seven rowers of the second rowing club founded in Porto Alegre, the state capital of Rio Grande do Sul, in southern Brazil. Given its vast newspaper coverage and effort to remember the event throughout the 20th century, this event is especially suitable to discuss the topic of death in sport.

According to Silva (2011), a concern for acquiring healthy habits, both physical and moral, related to sports practice, began to take hold of the imagination of Porto Alegre in the beginning of 20th century. This movement had a special relation with rowing, as can be seen in the birthday celebration speech of a rowing club in 1923, when Castello (1923, p. 88) highlighted the benefits of rowing, stating that the strokes develop "our forces, active respiration and movement, develop the volume of the lungs and chest, increase our force and our resistance" and also recorded the transformation of "anaemic teenagers, lymphatic and rickety" (ibid., p. 88) into healthy young men through sports practice.

Rowing was institutionalized in Rio Grande do Sul in the late 19th century. At that time, there was already a Gymnastics Society (currently called SOGIPA), which initially fostered gymnastic activity, and both societies fostered body/sports practices that reproduced representations of German Brazilian cultural identities. The first rowing clubs were founded for German Brazilians, beginning with *Ruder Club Porto Alegre*, in 1888, followed by *Ruder Verein Germania* in 1892. The clubs' language of internal communication was German, forcing anyone who wanted to enter that environment to master the language. The clubs' constitutions were an expression of the Porto Alegre context of that period, when there were many immigrants in the city, with different origins, but mainly from Germany and Portugal (Silva, 2011).

Motivated by their common German Brazilian fellowship, and further to promote rowing in the city, the two clubs supported each other in increasing the impact of the rowing associations in Porto Alegre. They co-operated in the foundation of an entity responsible for the organization of regattas, the Regatta Committee, established in 1894. This committee is considered the first sports federation of Brazil (Hofmeister, 1979; Licht, 2013), and its foundation occurred because of the desire of the German Brazilians, the *Ruder Club Porto Alegre* and *Ruder Verein Germania*, to organize the first official race in the city. This collaboration between the two clubs was limited to the scope of sports competitions, sporadically promoted races, individual challenges, and recreational excursions.

However, something unexpected and tragic happened in 1902. Seven young rowers were surprised by a storm while returning to Porto Alegre after a trip to a remote island about 12 kilometres from the capital, and their two boats sank. Three rowers survived and four young men died. In the aftermath, there were many newspaper reports, and comments containing reflections about dying, death and life, as well as the perils of sport.

This study seeks to understand the way in which people think about death in relation to sport, using this sporting tragedy as an example. We will look at death as expounded by the German philosopher Martin Heidegger, in relation to the newspaper reports, magazines and books covering the event.

Death in the Philosophy of Existence

In his early work, Heidegger (1978, 2007) took on the project of trying to describe human existence (*Dasein*) on the basis of first-person experiencing, in his project called 'fundamental ontology' that he worked on in the 1920s. Death is an important phenomenon in his description of human existence: an essential aspect of human life is that it is mortal. Since we often see death as something negative that we try to avoid in life (and even to avoid thinking about), Heidegger's philosophy helps us to see death as a meaningful and important phenomenon that is inseparable from life.

So, human existence is *always* finite, and this is an important ontological aspect of it – that is to say, mortality, and the omnipresence of the possibility of death, are inescapable facts for all of us, as human beings. Human life is precarious – any one of us can be struck down by disease, or by a car, or by the weather, in the next moment. We may speak about statistics on expectancy of life in different cultures, but in each individual case, we cannot be sure about our own length of life. However, often we do not live according to this fact. Rather, we most often try to avoid it, focussing on the joys and difficulties that occur in our lives. Of course, we 'know' we are going to die, but the way we live often does not reflect this. This is what Heidegger calls 'inauthentic existence', which stems from the phenomenon of 'falling' (*Verfallen*) describing our tendency to disperse ourselves in events that are happening and things around us, without much awareness of this fact of existence (e.g. Heidegger, 1978, p. 295). In sport, which offers a lot of interesting moments while striving towards a pre-given end, in trying to be better than an opponent, 'falling' is difficult to avoid. Also, sports are made to be safe educational activities through which we improve our lives, not lose them. So we do not expect death in sport – and when it happens it is a shocking tragedy. But these tragedies do happen, even in sport. That is why an explanation of Heidegger's understanding of death can enrich sport, so that participants are not naïve and inauthentic, but human beings, conscious of their humanity. As Heidegger says: "Death in this way of being gives to life a kind of sight, and constantly leads it before its ownmost present and past, a past that is growing within life itself and comes toward life from behind it" (Heidegger, 2007, p. 163). Through the phenomenon of death we can see the specific temporality of Dasein.

While describing the mode of existence of Dasein, Heidegger (1978, § 50 nn.) introduces the notion of 'Being-towards-death', which clarifies this fact of existence for us. 'Being-towards-death' does not mean that now we are alive and this is ended by death (dualism of life and death), but that in every moment of our lives, we are finite – and this has two aspects: (1) we can never return back to this moment (now); it is fleeting, it is here and then gone, we have to make choices that we cannot take back; (2) we know (if we dare to think about it) that we are going to die. And this can come any time, no matter how young or old we are. Heidegger says: "As soon as man comes to life, he is at once old enough to die" (1978, p. 289).

The rowers' deaths may help each of us to see our being as finite, not knowing how long we are going to be here, as described in the words '*memento mori*'. From this point of view, we could see our recurring return to this accident as remembrance ceremonies, as a celebration of life – of human existence that wants to see itself as it really is – as mortal. The death of these four young men can remind us of our vulnerability, not just

in the face of the elements, but also in ordinary daily life and in sport. We do not know when we are going to die, and so we should think a little about what is meaningful for us to do – what are our priorities. This understanding can help us to live, no matter how long we live, more authentically (according to Heidegger's account), i.e. according to our humanity.

In this study, we interpreted notes from different newspapers, magazines and books. Many newspapers and magazines published notes about the rowers' deaths, in Porto Alegre and in Rio de Janeiro, and in different periods. In the year, of the tragedy, the newspapers *O Independente* (Naufragos, 24/05/1902; Naufrágio, 24/05/1902) and *Jornal do Brasil* (O Reporter, 16/05/1902; Naufrágio, 07/06/1902) reported the news, as well as the magazines *Sport Nautico* (Vascaína, 01/06/1902) and *Revista da Semana* (Nixe-Walkure, 01/06/1902). Years after, the event was recalled by other publications, such as the newspaper *A Federação* (Ocorreu, 12/05/1914), the magazine *O Biguá* (Aniversário, 3/05/1930), and the book *Revivendo o Passado* (Fortini, 1953), and it is referred to till nowadays (e.g. Silva, 2011, 2015).

History of the first rowing tragedy in Porto Alegre

The rowing excursions organized by *Ruder Verein Germania* to places around Porto Alegre started in 1894. Destinations included Pedras Brancas, São Leopoldo, Aldeia dos Anjos, São Jerônimo, São Sebastião do Caí and São João de Montenegro. According to Litch (2001), the club organized its first excursions to Pedras Brancas Island in 1894. Pedras Brancas Island is located in Pedras Brancas city – which nowadays is Guaíba city, about 12 kilometres from Porto Alegre – and around the island were many large rocks. The excursions became frequent events organized by *Ruder Verein Germania* and *Ruder Club Porto Alegre*.

In 1896, both clubs made an excursion to the farm Quinca Peixoto, with some members going by packet-boat, and other by gigs and small boats (Rowing, 21/10/1896). However, according the newspaper *Correio do Povo* (Rowing, 23/10/1896), only *Ruder Verein Germania* kept to the programme. This kind of programme was more common among *Ruder Verein Germania* members than *Ruder Club Porto Alegre*. With the invention by the Regattas Committee in 1898 of the bigger annual competition *Wanderpreiss*, regattas within clubs and long excursions were incentivised.

The *Ruder Verein Germania* won the third *Wanderpreiss* in 1900, with the gig Freya and its oarsmen Hans Goeden, Hans Zeller, Julio Deppermann, and Whalter H. Deppermann, with Franz Protzen as cox. Three of these rowers participated in an excursion to Pedras Brancas Island on 11th May, 1902. Sadly, this was the excursion that ended with a shipwreck tragedy, which was reported in all the newspapers (Silva, 2015).

On May 11, 1902, there was a party in praise of the Holy Spirit and the Lady of the Conception in Pedras Brancas Island, just like every year, and *Ruder Verein Germania* organized an excursion to the party with two gigs for seven rowers and "many amateur races had taken place to carry there in several vessels members of the nautical centers of the city" (Vascaína, 01/06/1902, p. 4). For that purpose, on Sunday morning, the Nixe and Walkure gigs set sail from the *Ruder Verein Germania* boathouse. The first was manned by Hans Zeller and Hans Goeden and the other by Gustavo Bier Son, Luiz Rothfuchs,

Luiz Laurent, Ricardo Preussler and Whalter Deppermann, the latter being the cox (Vascaína, 01/06/1902). According to Licht (2001), Nixe was one of the first two gigs bought by *Ruder Verein Germania*, in 1894.

The participation of rowing clubs in this kind of event was common in Porto Alegre. Even before the institutionalization of rowing clubs, since 1877, longboats and dugouts had participated in the party to celebrate Our Lady of the Seafarers, the traditional major annual event to the Catholic patron saint of Porto Alegre (Licht, 2013). However, differently from the longboats and dugouts, the gigs are boats specifically designed to practice sport, so they are lighter and more fragile boats, so as to be faster, but also easier to sink or to break up.

When the rowers were returning from their trip to Pedras Brancas, in the late afternoon, they were surprised by a heavy storm with a strong wind that caused the gigs to sink. Three of the seven young men were saved because they swam many kilometres to the coast – "Luiz Rothfuchs Jr., Gustavo Bier Jr., and Whalter H. Deppermann were saved by swimming to the Ilha das Pombas" (Licht, 2001, p. 3). They were considered skilled swimmers, and tried to save their lives when they saw the waterlogged boats, breaking away from the Walkure and swimming toward Pedras Brancas (Vascaína, 01/06/1902). Nixe, the smaller gig, filled with water, as a result of wind and strong current, and turned over. At this time, the crew sought out the Walkure, getting closer to it to provide relief. However, the Walkure also soon filled with water and capsized. At this time, the cox called to everyone to abandon ship and to fall into the water, which they did, all of the crew clinging to the Walkure, striving to approach land.

When the magazine *Sport Nautico* (Vascaína, 01/06/1902) described the event, they said that the skilled swimmers did this in order to give relief to their partners, but of course we only have the testimonials of the survivors. It might have been considered an heroic act, but the human being is also motivated to save his own life, as well as helping another. These young men did what they could do – or could not do – to survive. We might infer that those who decided to swim showed a certain courage or fortitude (indeed, these terrible circumstances call forth such attributes). But, then, these four might have had more confidence in their swimming abilities, so we should not infer that those remaining with the wrecked boats lacked fortitude or courage – only that they died an awful death by drowning.

However, four rowers were not able to withstand the waves caused by the strong wind and heavy rain, and remained holding on to the fragile shipwrecked gigs: Hans Zeller (24 years), John Goeden (25 years), Ricardo Preussler (20 years) and Luiz Cristiano Laurent (17 years) (Licht, 2001; Os Naufragos, 24/05/1902; Naufrágio, 24/05/1902; Um Naufrágio, 12/05/1914; Aniversário, 03/05/1930; Fortini, 1953). Hans Zeller was 24 and was born in Germany, where he had a mother and relatives. He worked in the printing shop Reinhardt, in Porto Alegre. Luiz Laurent, who was the son of Professor Laurent, well known and esteemed in Porto Alegre, was 17 years old and, since born and raised in that city, found himself employed in the family business of Carlos Naschold. Preussler was 20, was born in Porto Alegre, son of Mr. Anthony Preussler, brother-in-law of Francisco Antonio Preussler and brother-in-law of Mr. Alberto Fehlauer, in whose musical establishment, on Andradas street of that city, he had already been some years as an employee (Nixe-Walkure, 01/06/1902).

The *Ruder Verein Germania*, after learning about the tragedy, sought to provide all possible help in hopes of finding the rowers. With empathy, and sharing the pain, *Ruder Club Porto Alegre* participated in the search for those missing (Naufragos, 24/05/1902), and was complimented by the newspaper *O Independente* (Naufragos, 24/05/1902). This tragedy touched the people in Porto Alegre city and the Brazilian rowing community, and newspapers from the Rio Grande do Sul capital and Rio de Janeiro followed the course of events, reported developments and provided space for those affected to express the feelings that were shared by so much of the population.

To the *Ruder Verein Germania*, as well as to the families of the young deceased, the newspapers expressed empathy for the pain of death, especially such unexpected deaths as these. In its tribute, *O Independente* said that it was "moved by such misfortune, and offers its deepest condolences" (Naufragos, 24/05/1902, p. 3). Furthermore, photos of the castaways were printed on the front page, "now serving a duty to print, in their honour, portraits of the shipwrecked unfortunates, bravely killed when fighting with the turbulent waters of our beautiful Guahyba" (Naufragos, 24/05/1902, p. 3). The news was also reported in Rio de Janeiro and the newspaper there made a tribute. *Sport Nautico*, a supplement of Revista da Semana, wrote "who could not be indifferent to the painful blow that has just damaged the racing societies here and in Porto Alegre, together with demonstrations provided to the memory of the dead ones to honour your grief?" (Vascaína, 1/06/1902, p. 4).

In the same way, the *Ruder Club Porto Alegre* helped in the search for the shipwrecked gigs and the rowers, in generously joining its Germania sister club, but soon the news came that it was too late for the rescue mission to be rewarded with happy success (Naufragos, 24/05/1902). *Ruder Club Porto Alegre* and *Ruder Verein Germania* were the only two rowing clubs in Porto Alegre, and both began with German Brazilian members, and so it is understandable that those socialized into German culture could identify with each other, and show solidarity.

In that period, Porto Alegre had about 73,674 inhabitants (Pimentel, 1945), a small city compared with nowadays, when there are about 1.5m inhabitants (IBGE, 2015). The rowers concerned worked in commerce in the city centre, and one newspaper source noted the "beautiful characters, all employees in our commerce, where they enjoyed the fruits of their daily work and knew how to sympathize with the honour and kindness of others" (Naufrágio, 24/05/1902, p. 3). So many people knew them, which enhanced the tragedy and shocked the inhabitants: "The longing of friends, the bleeding hearts of the fathers, covered in mourning, and Porto Alegre society deeply moved by this mournful event" (Naufrágio, 24/05/1902, p. 3). But now, their lives ended, they will have no more experiences, and we can have no more experiences of their actions, so they will always be remembered as of youthful good character, because they did not have time to live to an older age.

The first news about the matter came from Rothfuchs, who returned to Porto Alegre by ship. He swam 1 hour and 40 minutes to Pedras Brancas. The other survivors spent the night in a place covered with weeds (Vascaína, 01/06/1902). The survivors became heroes in the newspaper reports. A hero is a person who is admired for his courage, outstanding achievements or noble qualities, so for the newspapers, these young men were not merely survivors, but heroes, because they faced a very difficult challenge and had the courage and strength to survive.

Some days later, the four bodies were found – Goeden and Preussler in Pedras Bran-cas, Zeller close to the Asylo, and Laurent in Christal beach (Naufragos, 24/05/1902), but the newspapers waited until the last body was found to publish the news, twelve days after the shipwreck. According to the newspapers, on the Monday after the trag-edy, at 11am, the first body found was Goeden's. The body looked as if it was at rest on the land, in a sleeping position, which might suggest that he arrived on land alive, but could not endure. His body was in a state of putrefaction and his shirt was ruptured (Naufrágio, 24/03/1902; Vascaína, 01/06/1902). The gigs were found nearby (Vascaína, 01/06/1902).

Sleep and death can be compared – in both the eyes are closed and the body is motionless. Nevertheless, in sleep, the person will wake and come back to life, so there is still the hope to get a chance to say a proper goodbye. However, when death is confirmed, we feel as though "they were 'snatched' from us. We had no time to say goodbye – it was so sudden and unexpected." These were the words of Dr. Wallau, who examined Goeden's body and registered his death (Vascaína, 01/06/1902).

Of course, if we live our lives avoiding the acceptance of death, then death can come unexpectedly for us – but this happens because we were not aware of our humanity, which includes finiteness. This attitude shows our misunderstanding of death as being a part of our lives – as if we expected it to come announced, giving us time to deal with it, to express our farewells. Unlike this common view, Heidegger highlights a more realistic understanding of death, i.e. the fact of life that death can come any time. A tragedy of the death of the four young rowers can remind us of our finiteness. If we take the understand-ing of our finiteness seriously, our attitude will change – our lives will reflect the certainty as well as unexpectedness of death in our choices, and thus we will be better prepared for the possibility. Heidegger (1997, § 53) describes death as our possibility – a possibility of being towards death, because it is up to each of us to choose this possibility. If not, we live in the avoidance of death.

The other bodies of the rowers were found in the following days, but in an advanced state of decomposition and near the water line. The leadership of the *Ruder Verein Ger-mania* purchased a tomb for the burial of their four rowers in the Evangelical Cemetery (Naufrágio, 24/03/1902; Licht, 2002), which is connected to German Lutheran immi-grants, who were, according to Gertz (2001), the most articulate Protestant group to enter Brazil and firmly to establish itself (since 1819, especially after 1824). On 17th February 1856, they founded their Evangelical Community. In the book Grande Catecismo (1529), one of the major Lutheran texts, Martin Luther prays to the Father in Heaven, when at the time of death, he brings the people close to him; believing that there is life after death, and disseminating this idea among Lutherans. In the cemetery there were many people from the German community, offering "statements of regret from the honorable and industrious German colony of residents" (Naufrágio, 24/03/1902, p. 3). Despite bad weather during the week after the accident, the burial of the victims occurred on successive days, as many people attended (Naufrágio, 24/03/1902) to pay tribute, to pray or just to watch. Subse-quently, porcelain pictures were placed on the tombstone, in addition to the club shield and the messages of yearning on each tomb (Licht, 2002), to perpetuate the memory of the rowers and "to honour the memory of the unfortunate shipwrecked, burying them honourably" (Naufrágio, 24/03/1902, p. 3).

Heidegger's view of death is quite different from the one of Evangelical community. When Heidegger (1997, §49) talks about death, he talks about it in the context of life (human existence) and is not concerned with the question of life after death:

"[Our] analysis of death remains purely 'this-worldly' in so far as it Interprets that phenomenon merely in the way in which it *enters into* any particular Dasein as a possibility of its Being. Only when death is conceived in its full ontological essence can we have any methodological assurance in even *asking* what *may be after death*; only then can we do so with meaning and justification. Whether such a question is a possible *theoretical* question at all will not be decided here. The this-worldly ontological Interpretation of death takes precedence over any ontical other-worldly speculation" (Heidegger, 1978, p. 292).

So, for Heidegger, it is first necessary to understand death as a part of our lives (Being-towards-death), since we are humans existing in the world, and any interpretations of what may be after this comes next. When we start thinking about life after death before thinking about finitude of our lives, it may rather draw us away from the phenomenon of death and our acceptance of mortality.

Temptation towards idealization: sport, death and dying in news reports

In the news reports, we become aware of the human tendency to idealize the dead, especially the young dead, of whom we have such hopes and expectations for the future. (We say: 'Don't speak ill of the dead.') But we should beware of this temptation. Just because they died in this shocking way, we should not assume that they were good men, or heroes – for many cowards and villains have also died at sea.

This is not, of course, to besmirch the memory of these young men, of whom many were willing to speak highly – only to suggest that their demise is insufficient evidence of their virtue. Such idealization reaches the sphere of society, when the reporter E. da Gama romanticizes: "The Porto Alegre society, deeply moved by this mournful event, I see deprived of the honest and fruitful collaboration of these delicate young men who were their virtues, their true mainstays" (Gama, 24/05/1902, p. 3). The reports evidence a process of idealization and heroization in death which, although entirely understandable, indicates again our own incomprehension of death, and fear of dying.

And when we look at death as the opposite of life, it does indeed look like something alarming and frightening: "Unfortunate young men – full of life and happy when they left their families for this tragedy that it was fun to participate in, without thinking for a moment that this was the last time that their family would see them" (Gama, 24/05/1902, p. 3). Sometimes, we call the idea that everybody will die 'destiny' or 'luck', so as to suggest that death is not in our control and is not part of living: "How capricious luck combined with fate, as she delights in giving deep blows, well-aimed and unexpected, at frail humanity" (Gama, 24/05/1902, p. 3).

When the topic turns to the fact of dying, the interpretation changes, and it is possible to see the fear in the text of the author of the commentary, "how cruel and horribly awful must have been the slow agony of those unfortunates!" (Os Naufrágos, 24/05/1902, p. 3). Dying is potentially a very frightening, threatening and painful event (or set of events) in our lives, which scares us. That is why the reporters tended to idealize the rowers' courage:

"Thus, for long hours, evoking the good and merciful God, limbs benumbed with cold, numb through fear of imminent death, the miserable lads held their heads above water, until a last breath […] delivered in the most terrible of endings their souls to the Creator. The cruel fate of these brave boys!" (Os Naufrágos, 24/05/1902, p. 3).

On the other hand, the report also suggests how much the end of young lives seems especially tragic to us. We often think that we should live to an old age, to reach at least an average lifespan. Especially in current times, generally living longer than any other time in human history, a long lifespan is one of the measures of a developed society, and we may expect to live until old age. And that is why we see these four rowers as having died tragically – not getting their chance of a longer life. So in many reports the ages of the rowers are often mentioned, and how young they were, as well as about their life and relatives.

We can see how this affected their friends, their club, and their sport. And we have not even mentioned their parents, who will have to live bereft of a child. It is often said that the tragedy of a parent is to outlive a child – and especially these children, who had grown into strong men, with bright futures. Imagine the years of attention, effort, love, care and resources that had been invested into these young men, all to be lost in a day. From the viewpoint of life understood as an opposition to death, this is a tragedy.

Nevertheless, the newspapers brought other kind of reports too – those that provoked reflections about life: "What is life but a plaything of chance. They always say: birth is life. We will say: – born to die, because when we think that we will live tomorrow, that is the moment when we tumble into the dark and gloomy abyss of the tomb" (Gama, 24/05/1902, p. 3). In such thoughts, we can see how the rowers' death could help us to see our being as finite. Death is inseparable from life. And so, the tragic event also brought about important reflections on life, some of which resembled Heidegger's descriptions. With the four young men dying, we can see: if they had a life, like us, then we can also die, possibly also unexpectedly like them. We are all living and dying at the same time (see both aspects of death above). From this point of view, dying is an inseparable part of life.

The shipwreck remains in memory: '*memento mori*'

The effects of the tragedy were manifested in the rowing community. According to Licht (2002), it was the reason why the Regattas Committee cancelled the prize *Wanderpreiss* in 1902. The impact on rowing activities was strong, and latent members began to appear in the clubhouse. There was a significant attempt to recover the sporting life of the *Ruder Verein Germania*, whose leadership scheduled three internal regattas in September, October and December, with various tests and attractions, seeking to celebrate life. In this way, the club tried to show to society that it was staying alive.

Following this lead, in the next year, Luiz Cristiano Laurent's father, Ernesto Laurent, and Whalter Deppermann participated and won the prize *Wanderpreiss*. This was to show that life goes on, but perhaps with more care. Possibly, with the same intention, Gustavo Bier Son was in the group that founded the Rowing Club Almirante Tamandaré, on January 18, 1903. This club started with the goal to promote other practices, too, among them swimming, "We know that, in addition to rowing sport, the new club regattas to be based

in the capital will be dedicated also to swimming, shooting, gymnastics, etc." (Regatas, 15/01/1903, p. 2).

Swimming began in Rio Grande do Sul already in the late 19th century; and Porto Alegre was the main town for the development of sports practice in clubs. The main landmark of the emergence of swimming in Porto Alegre was the construction of the first pool in the state and in the country in 1885, by Turnerbund, the current SOGIPA. After the tragedy, swimming gained a pragmatic function – the possibility of saving lives in the aquatic environment – which promoted the practice in the city. This sport was considered an important practice by the rowers, because they could see that it could be a means of saving life if some misfortune occurred. Therefore, the Rowing Club Almirante Tamandaré published a note in the newspaper *A Federação* inviting members to practice swimming exercises while they did not have gigs to practice rowing (Regatas, 03/04/1903).

For memories to be perpetuated, they need to be continually renewed through elements that maintain that memory. However, to begin with, only one means was used to keep the memory alive – a frame with pictures of the four rowers in the gigs' boathouse of the *Ruder Verein Germania* (Fortini, 1953), which is still there. Furthermore, in the next year, the newspaper did not publish anything *in memoriam*, as a reminder. So quickly were events forgotten, that in the photo which showed the first four women to practice rowing, in 1907 (Silva, 2011), the clothes seem impossible for swimming: long skirts, blouses with long sleeves, ordinary shoes and hat. So, in just a short time, the risks of the practice had been pushed to the back of the mind.

Twelve years later, though, the events were recalled by the newspaper *A Federação* (Ocorreu, 12/05/1914). This newspaper reminded readers how young the rowers were, how fragile were the gigs, and how the survivors prevailed because of their swimming abilities. This refreshed the memory of the population of Porto Alegre (Assmann, 1995), as well as recollecting the commitment of the club: "As in previous years, the Club Germania made a deposit yesterday, in the catacombs where lie the remains of the unsuccessful rowers, very rich crowns with expressive markings" (Ocorreu, 12/05/1914, p. 3). This can be interpreted as an effort to keep alive the idea of 'life after death', with memories of how the young rowers lived and the connections among the community, because "the motivated production of memories as key components of the formation and perpetuation of individuals and communities – we only have left what society, in every age, is able to reconstruct for its own contemporary frame of reference" (Halbwachs, 1925).

Even after it changed its name in 1917, during the Brazilian government's initiative to nationalize the German Brazilian clubs, when it became Clube de Regatas Guahyba (Silva, 2011), the club still tried to keep alive the memory of the tragedy that marked the history of the *Ruder Verein Germania*. This was mainly for the club's members, because, in 1930, a publication in the club's magazine, *O Biguá*, talks about the tragedy in 1902. In this publication, the club invented a tradition, every year, that the club should send a commission to the cemetery to put flowers on the rowers' graves (Aniversário, 03/05/1930). Let us recall Hobsbawn's (1948, p. 9) definition of a tradition as a "set of practices, normally governed by tacit or openly accepted rules; such practices, of a ritual or symbolic nature, seek to inculcate certain values and norms of behavior through repetition, which automatically implies continuity with regard to the past".

From 1937 to 1945, a new Brazilian nationalization movement was initiated by New State[1], a dictatorial government, just after Clube de Regatas Guahyba and Clube Regatas Porto Alegre – the former *Ruder Club Porto Alegre* – combined to become Clube de Regatas Guahyba-Porto Alegre, in 1936 (Silva, 2011). Even with such changes, a frame with the young rowers' pictures was kept on the wall in the clubhouse until 1953 (Fortini, 1953). This can probably be explained as an attempt to invent or to sustain hero-figures, which Oliveira (2003, p. 68) explains as making a "symbolic constitution, which involves several symbolic battles for the appropriation of past events that should be remembered, and demarcation of those to be forgotten".

From reports in newspapers, magazines and books, we can see the initiative to build heroes, as a way of coming to terms with death. Both the rowers who died and the survivors were caught up in the discourse of hero-invention, with the survivors seen as omnipotent beings, successfully passing through a time of trial, even at the end of their tether. This evokes a lonely struggle with evil until the final triumph, "which implies the advent of a time of glorification, based on manifestations of pride and compassion, this is the basic profile of the hero that confirms their exceptional nature" (Araújo cited by Oliveira, 2003, p. 67). But as a side-effect of this cult of heroes who died in the sea, we can see the reminder of death: death can come at any time, at any age, unexpectedly, so it is important to keep the possibility in mind: "*memento mori*!"

CONCLUSION

The documentary analysis of the sinking of the boats and the deaths of Porto Alegre rowers in the early 19th century, leads us to reflections about a subject that does not often motivate researchers in the field of sports – death. When tragedies occur within sports, such events move people to reflections on life and its fragility. The tragedy of the sinking of the rowers in 1902 in Porto Alegre caused a commotion in the society of that time, and even many years later, the event was still remembered and often refreshed not only in the memory of the people of Porto Alegre, but also of the people who lived in other cities in the south of Brazil, who mourned the loss of their citizens/athletes/sportsmen.

In the sports scene, death creates conflicting representations – between improving health and strength, made possible by exercise, and the risk of injury or even death. Sports activities are usually represented as strategies to overcome physical and psychological limits, and they are meant to improve our lives[2]. However, when athletes sustain a serious injury or death in training or sports competitions, athletes and those around them may be drawn to realization that life is finite, and start thinking about the important existential fact that death belongs to life. In a way, some news reports pointed to the finitude of life as highlighted by Heidegger. We all are going to die some day, and the realization of this fact

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[1] New State is the name of the Brazilian political system founded by President Getúlio Vargas, in November 10, 1937, which lasted until October 29, 1945, which is characterized by centralization of power, nationalism, anti-communism and authoritarianism.

[2] However, this is not true about all sports – some sports are seen as dangerous and they are labelled in this way as 'risk sports', 'extreme sports' or 'dangerous sports' – see e.g. Russell (2005), Martínková, and Hsu (2009); and based on the phenomenological perspective see e.g. Breivik (2011).

should become part of our existence, not so much as a maudlin presentiment, but more as an active commitment to living more authentically, in line with the basic fact of the finitude of our existence. In the case of the sinking of the rowers, the three who survived did so because of their physical endurance and swimming skills. And after coming so close to death, it is possible that they started to give more care to the way they live.

With the death of four and the survival of three rowers, reflections on practical proposals motivated by staying alive and facing death were also covered by the newspapers in great detail, reflecting the imagination of Porto Alegre society. In this context, the event brought about strategies to save life and to prevent unexpected death. For example, the practice of swimming began to be valued more highly by rowers, and this motivated the teaching of swimming by sports clubs. We note that at that time, the early 20th century, there were pools at the Porto Alegre club, where people learned to swim in rivers and lakes; and also on the banks of the Guaiba Lake in Porto Alegre, near the docks, where all the rowing clubs were located. In addition, a new rowing club was founded, which included swimming practice: Grêmio de Natação e Regatas Almirante Tamandaré (Swimming and Rowing Club Admiral Tamandaré). However, although it is understandable to try to have strategies to guard against needless death, this should not lead us away from trying to understand death within our lives.

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