

RELATIVE AGE EFFECT ON BEHAVIOURAL REGULATION, BURNOUT POTENTIAL AND ANXIETY OF SPORTS STUDENTS

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ABSTRACT

Introduction: Relative age effect in sport is widely recognised due to the volume of research that has found a greater tendency for late born people within cohorts to dropout of sport before becoming adults than for early born people. However, most of the studies in relative age report on broad participation rates of people born at different times of the year. There is little research into potential psychological effects of relative age. Comparing early and late born people using psychological variables could provide valuable information about the mechanisms of dropout. Therefore, the purpose of the current investigation was to compare early and late born university sports students using the Sport Anxiety Scale-2 (SAS-2), the Behavioural Regulation in Sport Questionnaire (BRSQ) and the Athlete Burnout Questionnaire (ABQ). Early born participants were those born in the first 6 months of the academic year (September to February) and late born participants were born in the second half (March to August). Gender, size of place of birth and type of sport were also included as independent variables within the study. **Materials and Methods:** There were 222 students who participated in the study including 119 males and 103 females. **Results:** There were no significant differences between the early born and late born students for any of the psychological variables measured. There were also no significant interaction effects of half year of birth and any combination of gender, size of birthplace or type of sport on any of the psychological variables. **Discussion:** Efforts to model pathways for psychological variables based on month of birth cannot be justified based on the findings of the current descriptive study.

Key Words: gender, birthplace, motivation, dropout

RESUMEN

Introducción: El efecto de la edad relativa en el deporte es ampliamente reconocido debido al volumen de estudios que ha encontrado en una mayor tendencia de las personas nacidas más tarde dentro de una población base al abandono deportivo antes de convertirse en adultos que las personas nacidas antes. A pesar de ello, la mayoría de los estudios sobre la edad relativa indican amplias tasas de participación de las personas nacidas en diferentes épocas del año. Hay poca evidencia de los efectos psicológicos de la edad relativa. La comparación de los nacidos antes y después mediante variables psicológicas podría proporcionar una información valiosa acerca de los mecanismos de abandono. Por lo tanto, el propósito de la investigación fue la comparación entre estudiantes universitarios deportistas noveles y veteranos utilizando la Escala-2 de la Ansiedad Deportiva (SAS-2), el Cuestionario de Regulación Comportamental en el Deporte (RCCD) y el Cuestionario de Abandono de Atletas (CAA). Los participantes nacidos antes fueron los nacidos en los primeros 6 meses del año académico (de Septiembre a Febrero) y los participantes nacidos después nacieron en la segunda mitad (de Marzo a Agosto). El género, el tamaño del lugar de nacimiento y el tipo de deporte fueron también incluidos como variables independientes dentro del estudio. **Material y métodos:** 222 estudiantes participaron en el estudio, de los cuales 119 eran hombres y 103 mujeres. **Resultados:** no hubo diferencias significativas entre los nacidos antes y los nacidos después en ninguna de las variables psicológicas consideradas. Tampoco hubo efectos de interacción significativos de los nacidos en la mitad del año y ninguna combinación de género, tamaño del lugar de nacimiento o tipo de deporte en ninguna variable psicológica. **Discusión:** Los esfuerzos para modelar patrones para variables psicológicas basadas en el mes de nacimiento no pudieron ser justificados basándose en los resultados del presente estudio descriptivo.

Palabras clave: género, lugar de nacimiento, motivación, abandono

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INTRODUCTION

Annual age banding with specific cut-off dates is used to organise young people into cohorts in education and sport. For example, the UK education system uses a cut-off date of 1st September. The oldest children within an age band (September-born) have a relative age advantage over the youngest children within the age band (August born). The age of an individual relative to that of other members of their age band is referred to as relative age (Wattie et al., 2014). Relative age effect is a term used to represent short term and long term performance differences between older and younger children within age bands (Cobley et al., 2009). The short term effects include physical, social and cognitive advantages for the older children within age bands. The longer term effects include under-representation of those born late within the age banding year within elite adult sport. This may result from experiences of participation during junior years; the older children within cohorts may perform better, having a greater chance of selection, benefitting from opportunities and experiences that come with selection (Rejewski et al., 1979). This may encourage the relatively older children to continue participation into adult sport to a greater extent than relatively younger children (Delorme et al., 2010a; Delorme et al., 2010b; Delorme et al., 2011).

There have been many studies of sports participants' birth months that have provided evidence that relative age effects exist in sport. Cobley et al. (2009) did a meta-analysis of 38 such studies which concluded that there was a prevalence of relative age effect in sport but with small effects. Cobley et al. (2009) have recommended the use of a more expanded set of research methods to investigate relative age effect in sport. In particular, they recommended the use of qualitative investigations examining the experiences of developing athletes and the wider coaching environment. The need for qualitative research into the factors contributing to relative age effect has also been recognised by Delorme and Raspud (2009a). A recent interview study found that international netball players born in the second half of the academic year experienced social and performance attrition motives to a greater extent than their counterparts born in the first half of the academic year (Edwards and O'Donoghue, 2014). While Edwards and O'Donoghue's (2014) interview study provided in-depth knowledge about the experiences of young players born in different halves of the academic year, the sample size was small (n=13). Therefore, other survey techniques should be considered to allow larger sample sizes.

The pathways from birth month to dropout or continued adult participation are complex. The coaching environment, talent development, support networks as well as social, educational and other commitments all add to the complexity of studying mechanisms of relative age effect. Relative age

effects have been suggested to be both physical (Edwards, 1994) and psychological (Dudink, 1994). The older children within age bands are usually more physically, cognitively and socially developed than their younger peers. This may be the starting point of a set of inter-related pathways leading to psychological stress and potential dropout. The psychological concepts that have been associated with athlete dropout include anxiety, motivation and burnout (Cresswell and Eklund, 2003; Deci and Ryan, 1985; Baker et al., 2000). The current research explores variables representing these areas of sports psychology and whether they are influenced by relative age.

Dropout is a potential consequence of the athlete burnout syndrome (Cresswell and Eklund, 2003) which has been suggested to be comprised of emotional and physical exhaustion, sport devaluation and a reduced sense of accomplishment (Raedeke and Smith, 2001). Given the evidence that uneven birth month distributions of sports performers are due to greater dropout among late born performers than early born performers within cohorts (Delorme et al., 2010a, 2010b, 2011), it is worth comparing burnout potential between sports performers born in different halves of age banding years. According to Self Determination Theory, motives for sports participation can be autonomous and self-determined or controlled and externally regulated (Deci and Ryan, 1985). Both forms of motivated behaviour are relevant to the study of relative age effect in sport. Intrinsic motivations include performance accomplishment which may encourage young athletes to continue participation in sport. Selection for squads and social participation motives are external sources of motivation. These may be experienced to differing extents by players born in different parts of the age banding year (Edwards and O'Donoghue, 2014) especially when coaches are involved in the selection of teams (Hancock et al., 2013).

The case for comparing anxiety between sports performers born in different halves of the age banding year is derived from relationships between anxiety and other psychological factors that could differ between relatively older and younger sports performers. Where selection processes influence the levels of sport at which individuals participate, ego goal orientation is relevant. Ego goal orientation has been found to be positively associated with performance anxiety within adolescent figure skaters (Vealey and Campbell, 1988). Experiences of selection processes within ego oriented settings may differ between relatively older and younger performers, with relatively younger performers suffering deselection and non-selection to a greater extent than relatively older participants. This may lead to greater performance anxiety for the relatively younger athletes that is exacerbated by ego-orientation.

There are four dichotomous independent variables of interest to the current investigation; half year of birth, sex, type of sport and size of birthplace.

The participants in the current study are student athletes from many different sports which may have different cut off dates used for age-banding. Many young people in the UK are introduced to sports within school and, therefore, the academic year may be relevant to selection experiences of most young people. The year is split into two six month periods; H1 which represents birth dates between 1st September and 29th February and H2 which represents birth dates between 1st March and 31st August. There is evidence of greater relative age effects in male sports than female sports. For example, a larger strength of relative age effect has been found in the most popular male sports (Cobley et al., 2009). Sports type (individual sports and team sports) is also included as a factor as previous research has found different strengths of relative age effect between different types of sport (Delorme et al., 2009b). In North America, place of birth has been found to influence the chance of golfers, basketball players, baseball players and ice hockey players participating at professional levels of their sports (Côté et al., 2006; Baker and Logan, 2007). Therefore, size of birth place (less than 100,000 or 100,000 or greater) was also included as a factor. Thus the null hypothesis of the current investigation was that none of half year of birth, sex, sport type, birthplace size or any combination of these have an influence on motivation, burnout potential or the anxiety of student athletes.

The population group of interest to the current investigation is students of undergraduate university sports programmes. These are young people with enough interest and success in sport to choose to do programmes leading to career destinations in sport, exercise and physical education. While some are elite performers in their sports, the overall population of interest can be considered to be at a pre-elite level. This level has been found to have more prevalent and higher relative age effects than elite levels of sport (Cobley et al., 2009).

METHOD

Participants

Ethical approval for the current investigation was provided by the departmental research ethics committee of the authors' university. Second year students enrolled on sports programmes were advised of the purpose of the study and were able to specify whether they consented to participate. There were 222 students who provided complete data and consented to their data being included in the investigation. These students had ages ranging from 19 to 22 years and are summarised in Table 1.

TABLE 1
Frequency of participants according to gender, sport type,
size of place of birth and half year of birth.

Gender	Sport Type	Birth place of less than 100,000		Birth place of greater than or equal to 100,000	
		H1	H2	H1	H2
Female	Individual	10	10	8	10
	Team	23	23	10	9
Male	Individual	6	6	8	4
	Team	29	19	27	20

Instruments

A questionnaire pack was assembled including the Sport Anxiety Scale-2 (SAS-2) (Smith et al., 2006), the Behavioural Regulation in Sport Questionnaire (BRSQ) (Lonsdale et al., 2008) and the Athlete Burnout Questionnaire (ABQ) (Raedeke and Smith, 2001) to measure competitive anxiety, motivation and burnout respectively. Additional demographic and sport type questions were included at the end. The participants were provided with guidance on completing the questionnaire pack, computing scores and entering these into an on-line implementation of the survey.

Data analysis

Standard descriptive statistics were produced for each score of the three instruments for the two genders, two half years of birth, two types of birthplace and the two types of sport. MANOVA tests were applied to the BRSQ, ABQ and SAS-2 data including gender, half year of birth, size of birthplace and type of sport as between-participant effects. Wilk's λ and associated p values were determined for each main effect as well as the interactions between these effects. Any p values of less than 0.05 were deemed to be significant and warranted ANOVA tests being applied to the individual dimension scores of the given instrument. A Bonferroni adjustment was applied when analysing individual scores of the questionnaire instruments. This meant that p values less than 0.017, 0.008 and 0.006 indicated a significant influence of any factor on ABQ scores, SAS-2 scores and BRSQ scores respectively.

RESULTS

Table 2 summarises the MANOVA results revealing that gender had a significant influence on the SAS-2 scores but no other factor or interaction of factors had any significant influence on motivation, burnout potential or anxiety.

TABLE 2
Summary of MANOVA results.

Factors	ABQ			BRSQ			SAS-2		
	λ	F _{3,204}	p	λ	F _{9,198}	p	λ	F _{6,201}	p
Gender (G)	.930	1.7	.102	.997	0.2	.887	.927	2.6	.018
Half Yr of Birth (H)	.946	1.2	.269	.983	1.2	.470	.969	1.1	.388
Birthplace (P)	.949	1.2	.303	.995	0.4	.772	.962	1.3	.243
Sport Type (S)	.949	1.2	.303	.984	1.0	.353	.942	2.0	.061
G x H	.946	1.3	.263	.978	1.5	.203	.988	0.4	.875
G x P	.975	0.6	.831	.985	1.0	.374	.983	0.6	.746
G x S	.966	0.8	.648	.999	0.1	.964	.966	1.2	.322
H x P	.946	1.3	.262	.993	0.5	.709	.952	1.7	.122
H x S	.944	1.3	.240	.988	0.8	.470	.989	0.4	.900
P x S	.937	1.5	.159	.975	1.7	.158	.988	0.4	.866
G x H x P	.975	0.6	.826	.922	0.6	.640	.976	0.8	.565
G x H x S	.972	0.6	.762	.977	1.6	.196	.978	0.8	.604
G x P x S	.979	0.5	.890	.995	0.3	.801	.977	0.8	.584
H x P x S	.950	1.2	.332	.991	0.6	.606	.982	0.6	.712
G x H x P x S	.974	0.6	.801	.993	0.5	.687	.971	1.0	.432

Table 3 shows the various scores for participants classified according to the four main effects. A MANOVA test had revealed a significant gender effect on the anxiety scores ($\lambda = 0.927$, $F_{6,201} = 2.6$, $p = 0.018$). Follow-up univariate ANOVA tests revealed that gender had a significant influence on worry intensity ($F_{1,206} = 8.7$, $p = 0.004$) but no significant influence on any other anxiety intensity or direction (i.e., how individual's view their anxiety symptoms in relation to upcoming performance) score ($F_{1,206} \leq 4.0$, $p \geq 0.047$).

TABLE 3
Behavioural regulation, burnout potential, anxiety intensity and anxiety direction scores for different subsamples (mean+s).

Variable	Gender		Half Year of Birth		Birthplace Size		Sport Type		All (n=222)
	Female (n=103)	Male (n=119)	H1 (n=119)	H2 (n=103)	<100,000 (n=128)	≥100,000 (n=94)	Individual (n=62)	Team (n=160)	
<u>Behavioural Regulation</u>									
Intrinsic Motivation	21.0±2.8	21.8±3.2	21.4±3.3	21.4±2.8	21.6±2.6	21.1+3.5	21.4±3.0	21.6±3.0	21.4±3.0
Intrinsic Motivation for Accomplishment	23.4±3.6	23.2±3.8	23.3±3.9	23.3±3.4	23.2±3.8	23.4+3.5	23.3±3.7	23.1±3.6	23.3±3.7
Intrinsic Motivation to Gain Knowledge	20.6±4.9	21.0±4.7	20.5±4.9	21.1±4.7	20.6±4.7	21.1+4.9	20.8±4.8	20.6±4.5	20.8±4.8
Intrinsic Motivation to Experience Stimulation	22.5±3.7	23.1±3.5	22.9±3.8	22.7±3.4	22.9±3.6	22.8+3.7	22.8±3.6	22.9±3.5	22.8±3.6
Integration	20.4±4.3	20.2±4.6	20.4±4.7	20.2±4.2	20.4±4.2	20.1+4.8	20.3±4.5	20.2±4.4	20.3±4.5
Identified Regulation	20.6±4.0	21.0±4.5	20.8±4.2	20.9±4.4	20.8±4.0	20.8+4.6	20.8±4.3	20.7±4.3	20.8±4.3
Introjected Regulation	13.2±6.4	14.3±6.5	14.5±6.4	12.9±6.5	13.6±6.6	14.1+6.4	13.8±6.5	14.2±6.3	13.8±6.5
External Regulation	11.3±6.1	11.8±5.6	12.1±5.9	11.0±5.8	12.0±5.7	11.0+6.0	11.6±5.8	12.1±5.7	11.6±5.8
Amotivation	11.1±6.1	10.9±5.3	11.9±6.0	9.9±5.1	11.1±5.5	11.0+6.0	11.0±5.7	11.4±5.6	11.0±5.7
<u>Burnout Potential</u>									
Reduced Sense of Accomplishment	13.7±3.8	13.3±4.3	13.6±4.2	13.4±3.9	13.7±4.0	13.3+4.2	13.5±4.1	13.6±4.0	13.5±4.1
Emotional/Physical exhaustion	13.1±4.8	12.9±4.7	12.7±5.2	13.3±4.1	12.9±4.8	13.1+4.7	13.0±4.7	13.0±4.8	13.0±4.7
Devaluation	12.2±4.5	12.2±5.0	12.4±4.9	12.0±4.6	12.0±4.6	12.5+5	12.2±4.8	12.4±4.7	12.2±4.8
<u>Anxiety</u>									
Worry Intensity	14.3±3.9	12.2±4.0	12.8±4.1	13.6±4.1	13.7±4.2	12.3+3.9	13.1±4.1	13.2±4.1	13.1±4.1
Somatic Anxiety Intensity	10.9±4.0	9.4±3.7	10.1±4.0	10.1±3.8	10.4±4.0	9.6+3.8	10.1±3.9	9.8±3.8	10.1±3.9
Concentration Disruption Intensity	9.2±3.7	8.7±3.6	8.9±3.7	9.0±3.5	9.2±3.5	8.6+3.7	8.9±3.6	9.0±3.7	8.9±3.6
Worry Direction	-2.6±7.9	-0.4±6.9	-1.0±7.5	-2.0±7.5	-0.9±8.1	-2.2+6.4	-1.4±7.5	-0.9±7.5	-1.4±7.5
Somatic Anxiety Direction	1.8±6.3	1.9±5.8	2.8±5.9	0.8±6.1	2.0±6.0	1.6+6.1	1.9±6.0	2.6±5.8	1.9±6.0
Concentration Disruption Direction	-0.1±8.3	1.0±8.3	1.2±8.5	-0.3±8.0	0.6±8.1	0.3+8.6	0.5±8.3	1.4±8.6	0.5±8.3

DISCUSSION AND CONCLUSION

None of the four independent variables (gender, half year of birth, birthplace size or type of sport) or any combination of these variables had a significant influence on BRSQ or ABQ scores. Furthermore, none of half year of birth, size of birthplace or type of sport or any combination of these three variables had a significant influence on SAS-2 scores. The fact that half year of birth had no significant effect on any of the three instruments' scores suggests that there is no relative age effect on anxiety, motivation or burnout potential. This is explained by relative age being a secondary talent development factor (Wattie et al., 2011). These psychological concepts appear to be experienced by sports students born in different halves of the year to a similar extent. Therefore, the results of the current investigation do not justify modelling pathways from birth month to dropout from sport in terms of anxiety, motivation or burnout potential. While previous research has found relationships between motivation and burnout (Lonsdale et al., 2009), as well as between other psychological concepts such as ego goal orientation and anxiety (Vealey and Campbell, 1988; Smith et al., 2006), there is no evidence that these relationships explain relative age effects on sports participation. Similarly, while dropout is a potential consequence of athlete burnout syndrome (Cresswell and Eklund, 2003), the association between these variables cannot be explained by any pathway between birth month and dropout.

There are some methodological aspects of the current investigation that may explain the similarities in psychological variables between the sports students born in the two halves of the academic year. The participants are all involved in sports programmes and hence still interested and, in most cases, still participating in sport. There is evidence that late born players who persist in sport can enjoy greater success in adult sport than their early born counterparts (Deaner et al., 2013). This may explain similarities in psychological variables between the early and late born participants in the current investigation. The lack of participants who have actually dropped out of sports participation within the sample may have rendered any differences between relatively older and younger participants for psychological instrument scores insignificant.

The current investigation did not find differences in competitive anxiety between participants in individual and team sports. This agrees with a previous research study that found that type of sport does not have a significant influence on competitive anxiety (Hanton et al., 2008). The sole significant result in the current investigation was that the females had significantly higher worry intensity than the males. This agrees with some previous research into gender effect on competitive anxiety (Jones and Cale, 1989; Martens et al., 1990)

but disagrees with other studies (Perry and Williams, 1998; Hanton et al., 2008).

The lack of psychological differences between early and late born participants in the current investigation may be explained by relative age effects being more physical than psychological (Edwards, 1994). This is recognised to the extent that some researchers have suggested that biological maturation should be considered during selection (Hirose, 2012). Relatively older youth soccer players have been found to be more physically mature with larger body sizes, greater functional capacity (Figueiredo et al., 2009) and better fitness test performances (Vandendriessche et al., 2012) than relatively younger players.

In conclusion, the current study did not find a significant difference between sports students born in different halves of the academic year for anxiety, motivation or burnout potential. Female participants were found to have significantly higher worry intensity than male participants. However, there were no other significant effects of gender, half year of birth, size of birthplace, type of sport or any combination of these factors on any of the psychological concepts measured. Further research is recommended to examine anxiety, motivation and burnout potential including participants outside the sport student population and including those who are known to have dropped out of sport.

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