
Factors Affecting Engagement and Talent Development in a School- Based Sports Program

A thesis submitted for the degree

Doctor of Philosophy

April 2017

by

Thomas William John Lovell

Bachelor of Human Movement (Honours)

Supervised by

Prof Aaron James Coutts

Dr Job Fransen

Sport & Exercise Discipline Group

UTS: Health

University of Technology Sydney

Sydney, Australia

CERTIFICATE OF AUTHORSHIP AND ORIGINALITY OF THESIS

I certify that the work contained in this thesis has not been previously submitted either in whole or in part for a degree at the University of Technology Sydney or any other tertiary institution.

I also certify that the thesis has been written by me, Thomas Lovell. Any help that I have received in my research work and in the preparation of this thesis has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This research is supported by an Australian Government Research Training Program Scholarship.

Production Note:
Signature removed prior to publication.

Thomas Lovell

17 Nov 2017

Date Submitted

ACKNOWLEDGEMENTS

Professor Aaron Coutts, I cannot thank you enough for your patience, persistence, “motivation”, and belief in me to complete this thesis. I consider you a great friend, and your continued support, guidance and love of teaching has made all my years of undergraduate and doctoral studies incredibly enjoyable.

Dr Job Fransen, without your expertise and enthusiasm, finishing this PhD would not have been possible. You were instrumental in shaping the direction of this thesis and your passion was incredibly helpful. Thanks for pushing me over the finish line!

Corey Bocking, this thesis would not be possible without your vision and unwavering support for our research projects at Knox Grammar. You were responsible for developing my love of strength and conditioning, sports science, and of course coffee.

Dr Tom Kempton, thank you for being a great mate throughout this shared journey, and for your constant willingness to help my thesis progress. You’ve played a huge part in shaping both my PhD experience and career trajectory!

To Christie my beautiful wife, you have been with me every step of the way and I’m certain there is no one more excited than you that I have come to the end of this thesis. I can’t wait to pay you back for your years (and years) of patience, proof reading and expert number rounding skills ☺☺☺ You are the best!

Lastly, to both of my families, the Lovells and the Huttons. I can’t imagine this ever being possible without your constant encouragement and support of my work and study. I truly appreciate it and am forever grateful.

This project was supported by both the University of Technology Sydney and Knox Grammar School.

PREFACE

This thesis for the degree of Doctor of Philosophy is in the format of published or submitted manuscripts and abides by the ‘Procedures for Presentation and Submission of Theses for Higher Degrees – University of Technology Sydney; Policies and Directions of the University’. All manuscripts included in this thesis are closely related in subject matter and form a cohesive research narrative.

Based on the research design and data collected by the candidate, four manuscripts have been submitted for publication, and are currently either published or under review in peer-reviewed journals. These papers are initially brought together by an Introduction, which provides background information, defines the research problem and the aim of each study. A Literature Review then follows to provide an overview of previous knowledge regarding the factors influencing sports involvement and talent development in youth sport.

The body of the research is presented in manuscript form (Chapter 3 to Chapter 6), in a logical sequence following the development of research ideas in this thesis. Each manuscript outlines and discusses the individual methodology and the findings of each study separately. The General Discussion chapter provides an interpretation of the collective findings and practical applications from the series of investigations conducted. Finally, a Summary chapter provides a synopsis of the research hypothesis tested and conclusions from each project. Based on these findings, directions for future research are suggested. APA 6th reference format has been used throughout the document and a reference list included at the end of the thesis.

LIST OF PUBLICATIONS

Journal Publications

Lovell, T.W.J., Fransen, J., Bocking, C.J. & Coutts, A.J. (*under review*). Factors affecting sports involvement in a school-based youth cohort: implications for long term athletic development. *Journal of Sports Sciences*.

Lovell, T.W.J., Fransen, J., Bocking, C.J. & Coutts, A.J. (*under review*). A multidimensional approach to factors influencing playing level and position in a school-based soccer program. *Science and Medicine in Football*.

Lovell, T.W.J., Bocking, C.J., Kempton, T., Fransen, J. & Coutts, A.J. (2017). Factors affecting physical match activity and skill involvement in youth soccer. *Science and Medicine in Football*. DOI: 10.1080/24733938.2017.1395062.

Lovell, T.W.J., Fransen, J., Bocking, C.J. & Coutts, A.J. (*under review*). Factors influencing retention and development trajectories in a school-based youth soccer program.

Book Chapters

Lovell, T.W.J., Bocking, C.J., Fransen, J. & Coutts, A.J. (2015). “The Influence of Maturation, Physical Capacity, Technical Ability and Motor Competence on Playing Level and Position in Youth Soccer Players”. In T. Favero, B. Drust & B. Dawson (Eds.) *International Research in Science and Soccer II*. Routledge.

Conference Proceedings

Lovell, T., Bocking, C., Fransen, J. & Coutts, A. (2014). *Influence of Maturation, Coordination and Physical Capacity on Selection and Match Performance in Youth Soccer*. 4th World Conference on Science & Soccer, Portland OR, USA.

Lovell, T., Bocking, C., Fransen, J. & Coutts, A. (2014). *The Influence of Anthropometry, Maturation and Physical Capacity on Playing Position and Match Involvement in Youth Soccer Players*. 1st Asia-Pacific Football & Futsal Seminar, Melbourne, AUS.

Lovell, T., Bocking, C., Fransen, J. & Coutts, A. (2013). *The Influence of Motor Ability and Physical Capacity on Team Selection and Physical Match Performance in Youth Soccer Players*. 18th annual Congress of the European College of Sport Sciences, Barcelona, ESP.

Additional Relevant Publications

Fransen, J., **Lovell, T.W.J.**, Bennett, K.J.M., Deprez, D., Deconinck, F.J.A., Lenoir, M. & Coutts, A.J. (2017). The influence of restricted visual feedback on dribbling performance in youth soccer players. *Journal of Sports Sciences*, 21(2), 158-167.

ABSTRACT

School-based sports programs provide important early sports experiences for children and young athletes, with opportunities to participate in recreational sport, or invest in developing skills required to achieve excellence. However, the suitability of school programs to balance long-term sports engagement with opportunities to develop excellence is not yet known. Four related studies were used to investigate the factors influencing sports participation and talent development in a school-based sports program. Firstly, in a cohort of 501 adolescent sport participants from 25 different sports, Study 1 showed physical and motor competence profiles to be very similar between sports in young athletes, before becoming more heterogeneous with increasing age. Participants at higher levels of competition also reported a delayed engagement in their primary sport. Study 2 employed a multidimensional approach to examine the factors influencing talent selection in adolescent soccer players (N=214), revealing fitness, technical ability and motor competence to be important for talent selection, while players seemed to be guided into playing positions based on maturation, anthropometry and physical performance. Study 3 employed a mixed model approach to examine the factors influencing match activity in youth soccer, showing playing level, playing position and individual fitness characteristics to all influence both match running and skill involvements during match-play. Finally, Study 4 employed a two-year cohort-longitudinal design (N=172), showing players selected into lower playing levels to be more likely to drop out of the school-based soccer program. Additionally, the program did not seem to support retention of motor competence. Collectively, these studies suggest development opportunities may be confounded by the talent selection process, and the school environment may not be suitable for the retention of motor

competence. However, schools may also provide an ideal setting to implement a sampling pathway, which may be the most suitable for early sports involvement, improving motor competence, long-term engagement, and development of excellence.

KEYWORDS

Talent identification

Talent selection

Multidimensional

Sports participation

Adolescence

Maturity

Motor competence

Sampling

Excellence

Soccer

Developmental Model of Sports Participation

ABBREVIATIONS

α	Cronbach's alpha
ANCOVA	analysis of covariance
ANOVA	analysis of variance
APA	American Psychological Association
APHV	age at peak height velocity
CI	confidence interval
cm	centimetres
CV	coefficient of variation
df	degrees of freedom
DMSP	Developmental Model of Sports Participation
DMSSP	Developmental Model of School Sports Participation
F	F-value
FFA	Football Federation Australia
GPS	global positioning system
h	hours
HSR	high-speed running
ICC	intra-class correlation
kg	kilograms
km	kilometres
$\text{km}\cdot\text{h}^{-1}$	kilometres per hour
KTK	Körperkoordinationstest für Kinder
m	metres
$\text{m}\cdot\text{min}^{-1}$	metres per minute
MANCOVA	multivariate analysis of covariance

MANOVA	multivariate analysis of variance
min	minutes
mm	millimetres
MQ	motor quotient
MSFT	multi-stage fitness test
N	number
NS	non-significant
η^2	eta-squared effect size
p	statistical significance
PE	physical education
s	seconds
SD	standard deviation
TD	total distance
UGent	Ghent University, Belgium
UTS	University of Technology Sydney
χ^2	chi-square
y	years
YYIR1	Yo-Yo Intermittent Recovery Test Level 1

DEFINITIONS

Talent

A combination of innate attributes and developed abilities pertaining to performance in a particular sport

Talent identification

The process of recognising participants with the potential to become elite performers in a particular sport

Talent development

Providing sport participants with a suitable learning environment so that they have the opportunity to realise their potential

Talent selection

The ongoing process of identifying players who demonstrate the performance required for inclusion in a given squad or team, choosing the most appropriate individual to carry out the task within a specific context

Excellence

The pinnacle of performance in a particular domain, which may be interchangeable with expertise or elite performance

Deselection

The inevitable occurrence of young participants not retained throughout the talent identification and talent selection process

Dropout

The withdrawal of a participant from a particular sport or activity

CONTENTS

CERTIFICATE OF AUTHORSHIP AND ORIGINALITY OF THESIS	I
ACKNOWLEDGEMENTS	II
PREFACE	III
LIST OF PUBLICATIONS.....	IV
ABSTRACT	VI
KEYWORDS.....	VIII
ABBREVIATIONS	IX
DEFINITIONS.....	XI
CONTENTS	XII
FIGURES.....	XIV
TABLES	XVI
1 INTRODUCTION	1
1.1 BACKGROUND	2
1.2 RESEARCH PROBLEM.....	3
1.3 STUDY OBJECTIVES	6
2 REVIEW OF LITERATURE.....	12
2.1 CHAPTER OVERVIEW.....	13
2.2 YOUTH SPORT PARTICIPATION.....	14
2.3 DEVELOPMENTAL MODEL OF SPORTS PARTICIPATION	26
2.4 SCHOOL-BASED SPORTS PROGRAMS	36
2.5 DIRECTIONS FOR FUTURE RESEARCH.....	39
2.6 SUMMARY	39
3 STUDY ONE.....	41
ABSTRACT	42
INTRODUCTION	43
METHODS.....	46
RESULTS	52
DISCUSSION.....	59
4 STUDY TWO.....	65
ABSTRACT	66
INTRODUCTION	67

METHODS.....	69
RESULTS	79
DISCUSSION.....	88
5 STUDY THREE	94
ABSTRACT	95
INTRODUCTION	96
METHODS.....	98
RESULTS	106
DISCUSSION.....	109
6 STUDY FOUR.....	116
ABSTRACT	117
INTRODUCTION	118
METHODS.....	120
RESULTS	125
DISCUSSION.....	131
7 DISCUSSION.....	137
7.1 MAIN FINDINGS	138
7.2 LIMITATIONS	144
7.3 PRACTICAL APPLICATIONS.....	146
8 SUMMARY	151
8.1 THESIS SUMMARY	152
8.2 DIRECTIONS FOR FUTURE RESEARCH.....	155
9 APPENDIX.....	156
9.1 SPORTS PARTICIPATION HISTORY QUESTIONNAIRE.....	157
10 REFERENCES	163

FIGURES

Figure 1.1	The pathway to successful sports participation in school-based sports programs. ...5
Figure 1.2	Four studies aimed at investigating successful sports participation pathways for school-based sports programs. 11
Figure 2.1	The ‘Negative/positive spiral of (dis)engagement’ shows the relationship between motor (in)competence, physical (in)activity and (lack of) physical fitness (Stodden et al., 2008). EC; early childhood, MC; middle childhood, LC; late childhood. 22
Figure 2.2	The Developmental Model of Sports Participation (DMSP) (Côté, 1999; Côté, Baker, & Abernethy, 2003, 2007; Côté & Fraser-Thomas, 2007; Côté et al., 2009)..... 28
Figure 3.1	Körperkoordinationstest für Kinder (KTK): a) jumping sideways, b) moving sideways, and c) walking backwards. 50
Figure 4.1	1-4-3-3 tactical formation employed by all teams in the present study; ATT; attacker, MF; midfielder, FB; fullback, CD; central defender 71
Figure 4.2	Modified T-test dimensions, according to the methods of Deprez et al. (2014b).. 73
Figure 4.3	UGent Dribble Test dimensions, according to the methods of Vandendriessche et al. (2012) 76
Figure 4.4	Visual analogue scale (0-100 point) used to measure coach subjective ratings of player ability..... 77
Figure 4.5	Territorial map of the players relative to playing level (Team 1; ○, Team 2; △, Team 3; +) according to canonical discriminant functions. Centroids represent the mean variate scores for each group..... 83
Figure 5.1	Percentage effects of covariates on log transformed data for relative a) total distance, b) high-speed running distance and c) skill involvements (90% CI). 108
Figure 6.1	Age-related development trajectories of a) stature, b) body mass, c) sprint performance, d) explosive leg power, e) aerobic fitness, f) flexibility, g) motor competence and h) technical ability in youth soccer players. YYIR1; Yo-Yo Intermittent Recovery Test

Level 1, KTK; Körperkoordinationstest für Kinder, MQ; motor quotient, **; Interaction effect ($p < 0.001$), †; Time effect, a; Between-subjects effect. 131

Figure 7.1 The proposed Developmental Model for School Sports Participation, adapted from Côté et al. (2007). 149

TABLES

Table 3.1	Senior cohort sport differences in maturation, anthropometry, physical capacity, and motor competence.	54
Table 3.2	Junior cohort sport differences in maturation, anthropometry, physical capacity, technical ability and motor competence.	55
Table 3.3	Discriminant function structure coefficients and tests of statistical significance. .	56
Table 3.4	Junior cohort playing level differences in maturation, anthropometry, physical capacity, motor competence and sport participation history.	58
Table 4.1	Playing level differences in maturation, anthropometry, physical capacity, technical ability and motor competence.	81
Table 4.2	Discriminant function structure coefficients and tests of statistical significance. .	82
Table 4.3	Classification matrix for the players' actual and predicted playing levels according to discriminant functions.	82
Table 4.4	Playing position differences in maturation, anthropometry, physical capacity, technical ability and motor competence.	85
Table 4.5	Playing position differences in subjective coach ratings	87
Table 5.1	Maturity, anthropometry and physical capacity by school year cohort.	104
Table 5.2	Covariates included in model specification.	105
Table 5.3	Percentage effects of covariates on log transformed relative total distance, high-speed running distance and skill involvements (90% CI).	107
Table 6.1	Differences in anthropometry, physical capacity, technical ability and motor competence between retained and dropout players.	126
Table 6.2	Repeated measures for anthropometry, physical capacity, technical ability and motor competence across three testing periods in junior and senior cohorts.	129
Table 8.1	Summary of the studies conducted as part of the thesis.	153