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**Coaches and parents hold contrasting perceptions of optimal youth development activities
in track and field athletics**

PHILIP E. KEARNEY^{1,3*}, THOMAS M. COMYNS^{1,3}, & PHILIP R HAYES²

¹Department of Physical Education and Sport Sciences, University of Limerick, Limerick, Ireland;

²Department of Sport, Exercise and Rehabilitation, Northumbria University, UK

³Health Research Institute, University of Limerick, Limerick, Ireland

*Correspondence concerning this paper should be addressed to Philip E. Kearney, Department of Physical Education and Sport Sciences, University of Limerick, Limerick, Ireland. E-mail: kearneype@gmail.com.

27 Abstract

28 This study examined track and field coaches' and parents' knowledge of: (a) the relationship
29 between adolescent and later success, (b) factors contributing to adolescent success, particularly
30 in relation to relative age effects, and (c) optimal athlete development practices, such as the
31 timing of sport specialisation. Fifty two coaches and 116 parents completed a survey comprising
32 both closed and open questions. Compared to coaches, parents were more likely to believe that
33 successful adults had achieved success during early adolescence, and to connect that success to
34 innate ability rather than relative development. However, there was no difference in the
35 proportion of parents and coaches who reported familiarity with the relative age effect
36 (approximately 50%). The most pronounced differences between coaches and players were in
37 relation to optimal youth development practices, with parents more likely to encourage year
38 round training at an earlier age, and specialising in a single sport at an earlier age. Contrasting
39 the knowledge reported by coaches and parents with the results of quantitative studies of youth
40 development suggests that bespoke education is required for both groups. Furthermore, the
41 explanations provided by parents and coaches for their beliefs about youth sport practices
42 suggest that professional bodies need to provide more nuanced instruction to stakeholders on
43 how to implement general guidelines on healthy youth sport practices into their individual
44 practice.

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46 *Keywords: youth sport; sport specialisation; relative age effect; knowledge; sport volume*

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Introduction

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A range of professional bodies have expressed concern about an apparent increase in inappropriate youth sport practices, such as engagement in intensive training before the young person is ready^{1,2}. Parents and coaches are believed to encourage such inappropriate youth sport practices due to the misconception that a high level of achievement at youth level predicts adult success³. However, a range of studies have established that performances at youth level, particularly during childhood and early adolescence, have little bearing on an individual's potential to succeed in adult level sport^{4,5}. For example, Boccia and colleagues⁴ reported that only 17% to 26% of top-level Italian adult track and field athletes were considered as such when they were 14 to 17 years of age. Similarly, Kearney and Hayes⁵ reported that only 9% (male) to 13% (female) of top 20 ranked senior track and field athletes from the United Kingdom were also ranked in the top 20 for their age grade when they were 12 years of age. In order to promote healthy youth experiences within sport, there is a need to identify the specific beliefs held by youth sport coaches and parents about the factors contributing to success at both youth and adult levels^{6,7}.

Success at youth level is due to the complex interaction of a wide range of individual and environmental factors⁸. For example, observations of athlete behaviours during practice reveal that more effective learners utilise enhanced self-regulatory skills⁹. Coach effectiveness is also a critical factor⁸, with multiple studies indicating that coaches differ in the quality of their planning¹⁰, observation¹¹, and practice behaviours¹². The extent and nature of parental involvement has also been shown to play a key role in youth athletes' development¹³. In addition, children and adolescents vary widely in the rate and timing of their maturation¹⁴, with consequences for sporting success during adolescence. A proportion of coaches and parents are

72 believed to falsely equate early maturation with potential for future success¹⁵, leading to an over-
73 representation of early maturing athletes within youth high performance training squads¹⁶. Such
74 beliefs may also contribute to the enhanced competition success for athletes born shortly after the
75 cut-off date for youth age categories (termed the relative age effect^{17, 18}). Specifically,
76 individuals born in the first quarter of the year are more likely to be selected to training camps¹⁷
77 or to achieve national top 20 ranking¹⁸ than their later born peers. Understanding this wide range
78 of factors which contribute to success during adolescence is important for the design of optimal
79 athlete development environments.

80 Considerable research has attempted to identify the optimal developmental activities for
81 youth athletes¹⁹⁻²³. The activities examined within such research include: the age at which
82 athletes initiate sport; single versus multi-sport participation; the extent to which activities place
83 a primary emphasis on play/immediate enjoyment versus practice/improvement; and the
84 frequency and nature of competition. It appears that athletes follow a diverse range of nuanced
85 pathways to expertise¹⁹⁻²³. For example, Storm et al.'s¹⁹ analysis of the development of elite
86 Danish athletes emphasised the variation present in the ages at key transition points, the manner
87 in which different sports were sampled, and the precise nature of practice at different phases of
88 development. Reflecting these findings, the International Olympic Committee's consensus
89 statement on youth sport¹ concluded with broad recommendations on optimal development
90 activities; specifically, children were encouraged to initially participate in a variety of different
91 unstructured and structured age-appropriate sport-related activities, before gradually progressing
92 towards a more adult-like pattern of sport participation in a flexible, individual-specific manner.

93 While the International Olympic Committee's consensus statement represents an
94 important source of guidance for coaches and parents, the design of effective interventions to

95 support the coaching process also requires an understanding of current coach and parent
96 knowledge and practice²⁴. For example, coaches are primarily responsible for the transition into
97 intensive training²⁵, and are a key influencing variable on athletes' adherence to guidelines²⁶. A
98 growing body of research has explored coaches^{7, 27, 28} and to a lesser extent parents^{6, 29}
99 knowledge of factors relating to optimal youth development in sport. Post et al.⁷ identified that
100 coaches were concerned about specialisation, but largely unaware of the guidelines that their
101 athletes were supposed to be following. Specifically, only 14.6% of basketball coaches surveyed
102 were aware of the NBA/USA Basketball Youth Guidelines, and only 31.8% of baseball coaches
103 correctly answered questions regarding the Pitch Smart Guidelines⁷. Across all sports, only 11%
104 of respondents correctly identified the guidelines endorsed by the American Academy of
105 Pediatrics and the American Orthopedic Society for Sports Medicine regarding the maximum
106 number of months per year that players should be engaged in their sport (8 months)⁷. Similarly,
107 Bell et al.⁶ identified that while 55% of parents surveyed considered sport specialisation to be a
108 problem in youth sport, over 80% had no knowledge of sport volume recommendations in
109 relation to hours per week, months per year, or simultaneous participation in multiple leagues.
110 Identifying the specific shortcomings in coach and parent knowledge is vital to inform
111 economical educational initiatives.

112 Parents and coaches make specific and evolving contributions to young athletes'
113 development³⁰⁻³², and a young athlete has a greater chance of success if all stakeholders' views
114 are aligned^{33, 34}. Research in the context of junior performance tennis revealed that stakeholders
115 only weakly agreed with the findings of research on core principles of talent development (early
116 specialisation and selection; role of practice; role of athlete development; relationship between
117 junior and adult success; the role of stakeholders)³³. Furthermore, there was a lack of coherence

118 in each group's understanding of what the other stakeholders believed. For example, in response
119 to sport specialisation and selection, coaches indicated that they supported the research view, but
120 felt that parents did not. In contrast, parents answered that they supported the research view, but
121 that coaches did not. Such a lack of coherence may compromise the quality of a young athletes'
122 development³⁴.

123 The majority of research into coach and parent beliefs in relation to sport specialisation
124 has been conducted in the United States of America. There is a need for additional research to be
125 conducted in other jurisdictions, with differing youth sport cultures³⁵. Culture refers to "a set of
126 ideas shared by members of a group"¹⁹; within the context of youth sport, such shared ideas
127 might relate to traditional sports with their associated practices and seasons, the general emphasis
128 on sport for all versus high performance sport, or key characteristics of national culture³⁶⁻³⁸. The
129 recent publication of research on the development of youth track and field athletes in the United
130 Kingdom based on performance databases^{5, 18, 39, 40} offers an ideal opportunity to compare the
131 reality of athlete development to coach and parent perceptions of athlete development.
132 Consequently, this study aimed to identify track and field coaches' and parents' knowledge of:
133 (a) the relationship between youth and later success, (b) factors contributing to youth success,
134 particularly in relation to relative age effects, and (c) optimal athlete development practices,
135 particularly in relation to sport specialisation.

136 **Method**

137 **Design**

138 This study utilised a descriptive cross sectional design. Ethical approval was obtained
139 from the local University Research Ethics Committee.

140 **Participants**

141 Fifty two coaches and 116 parents completed the survey. Inclusion criteria for coaches
142 were that they were currently coaching athletes aged between 10 and 19 years old. Inclusion
143 criteria for parents were that their children were: (a) aged between 10 and 19 years and (b) were
144 currently competing in athletics. Table 1 provides an overview of the demographic information
145 provided by the respondents.
146

147 Table 1.

148 *Participant demographic information*

| Measure | Levels | Coach (N=52) | | Parent (n=116) | |
|--|---|--------------|-------------|----------------|------------|
| | | N | Mean (SD) | N | Mean (SD) |
| Age | | | 48.6 (13.7) | | 47.4 (7.3) |
| Sex | Male | 46 | | 48 | |
| | Female | 6 | | 68 | |
| Experience as an athlete | International | 14 | | 1 | |
| | National | 7 | | 6 | |
| | Club | 14 | | 15 | |
| | Youth | 4 | | 24 | |
| | None | 11 | | 60 | |
| Age of athletes* | Under 11 | 8 | | 12 | |
| | Under 13 | 21 | | 27 | |
| | Under 15 | 35 | | 65 | |
| | Under 17 | 32 | | 43 | |
| | Under 20 | 32 | | 21 | |
| | Senior | 18 | | 5 | |
| Years experience (as coach or parent in athletics) | | | 14.8 (13.1) | | 5.4 (2.9) |
| Holding coaching qualification | Level 1 | 11 | | | |
| | Level 2 | 24 | | | |
| | Level 3+ | 16 | | | |
| Holding other relevant qualifications | None | 29 | | | |
| | Basic (e.g., other sport level 1) | 11 | | | |
| | Advanced (e.g., PE teacher; MSc Coaching) | 12 | | | |
| Weekly hours coaching | | | 9.7 (7.2) | | |
| Coaching single/multiple event groups | Single | 34 | | | |
| | Multiple | 18 | | | |
| Level of athletes coached in the last three years | National/Regional finals at u13/u15 | 39 | | | |
| | Local level | 5 | | | |
| | Not coaching u13/15 | 7 | | | |
| Children involved in athletics | 1 | | | 67 | |
| | 2 | | | 36 | |
| | 3+ | | | 13 | |

149 Note: *Typically participants coached across multiple age groups

150

151 **Survey Development**

152 The development of the survey was guided by specific design steps (e.g., expert review,
153 pilot study) and considerations (e.g., organization of questions by topic, sequencing of topics,
154 question types), reflecting recommendations for developing surveys^{41, 42}. The lead author
155 developed the initial survey, based upon recent quantitative analyses of the development of track
156 and field athletes within the United Kingdom^{5, 18, 39, 40}. The primary findings from these studies
157 that informed question design were: (a) that only a small minority of successful senior athletes
158 had been successful as youth athletes; (b) the typical season length reported by youth athletes; (c)
159 the typical engagement in multiple event groups reported by youth athletes; and (d) the influence
160 of relative age on performance within youth athletics. The draft survey was reviewed by two
161 academics, each with over 20 years' experience lecturing in sports coaching. Subsequently, a
162 pilot test was completed which involved two track and field coaches, both of whom had above
163 25 years coaching experience, and six parents, who had been involved in athletics as parents for
164 between 2 and 5 years. In addition to completing the survey, both the coaches and the parents
165 were interviewed to suggest any alterations to the survey. The main adjustments made were to
166 alter the order of the questions, and to split one question into two.

167 The final version of the survey was composed of four sections and between 18 (parents)
168 and 24 (coaches) questions, depending upon the respondent's answers. The questions in section
169 one focused on demographic information. All respondents were asked about their age, gender,
170 experience (as coach or parent) and whether they had competed as an athlete. Coaches were also
171 asked about: their coaching qualifications; other relevant qualifications; and the age groups,
172 events, and skill levels of the athletes they coached. Parents were also asked about: how many of
173 their children were involved in athletics; what events their children were involved in; and the

174 level at which their children competed. The second section was composed of four questions
175 focused on the relationship between success at the different age grades present in competition in
176 the United Kingdom (U13, U15, U17, and U20) and adult success. The third section was
177 composed of four questions focused on optimal practices for development in relation to multi-
178 sport participation, multi-event participation, the focus of practice sessions (immediate
179 enjoyment vs. long term improvement), and year-round engagement in the sport. The final
180 section focused on factors responsible for youth success. One open question asked participants to
181 identify the three factors most responsible for youth success. A second question assessed
182 knowledge of relative age effects, with three follow up questions for respondents who suggested
183 that relative age impacted youth athletic performance. Sections 2-4 also contained optional
184 questions where participants could provide a reason for their responses. A copy of the survey is
185 available from the lead author.

186 **Procedure**

187 As the population characteristics of parents and coaches was not known, a convenient
188 sample was recruited. The survey was distributed in two ways. A link to an online survey tool
189 (Bristol Online Survey, www.onlinesurveys.ac.uk) was promoted via social media (Twitter).
190 This online survey was active for four months. Secondly, hardcopies of the survey were
191 distributed to individuals attending one county age group championships and one national age
192 group championships. These championships were chosen as we were focused on parents and
193 coaches of athletes engaged in competitive rather than recreational sport. At these
194 championships, potential participants were approached and asked if they wished to hear about
195 the survey. Those who indicated that they were interested were given a choice between a

196 hardcopy to complete that day, or a link to the online survey that they could take away and
197 complete later.

198 **Data Analysis**

199 The responses from the closed questions were entered into SPSS v24 and descriptive
200 statistics calculated. As the ratio level data (e.g., percentage top senior athletes achieving
201 success at youth age grades) was not normally distributed, Holm-Bonferroni corrected⁴³ Mann
202 Whitney U tests were used to examine differences between coaches and parents. Pearson's r was
203 used to provide a measure of effect size⁴⁴. Chi-squared tests were used to analyse the categorical
204 data (e.g., proportion of parents and of coaches aware of the relative age effect), with Cramer's V
205 providing a measure of effect size⁴⁴.

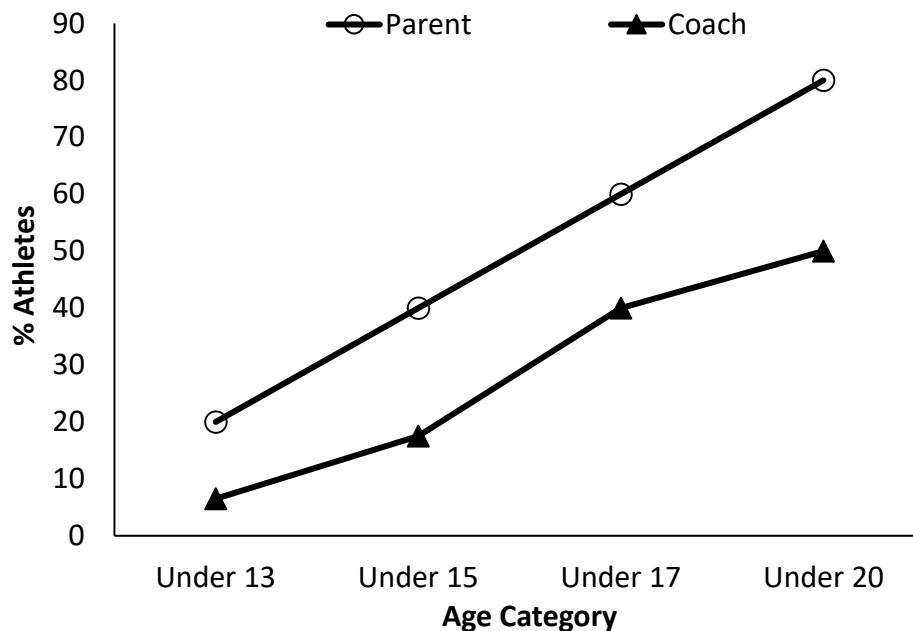
206 A two-step inductive content analysis⁴⁵ was used to analyse the responses to the open
207 ended questions. In the first step, meaning units were identified within the responses, and each
208 meaning unit was coded with a provisional code describing the topic. Once all responses had
209 been coded, the codes were reviewed and refined for consistency (i.e., each item within a code
210 refers to the same concept) and exclusivity (i.e., no overlap between codes). In the second step,
211 codes with similar meanings were grouped together, and a new label generated which
212 summarised the identity of that group of codes. To enhance the quality of the coding process,
213 during both steps an independent researcher acted as a "critical friend"⁴⁶, challenging and
214 developing the interpretations of the lead author.

215 **Results**

216 **Perceptions of the relationship between adolescent and later success**

217 The perceived relationship between adolescent and adult success was examined by asking
218 respondents to indicate what percentage of top performing senior athletes they believed had

219 experienced success at each age grade from U13 through to U20. Participant median responses
 220 are illustrated in figure 1. Holm-Bonferroni corrected Mann-Whitney U tests revealed that
 221 parents believed that a higher percentage of top ranked seniors had been successful at youth level
 222 compared to coaches: U13, $Z = 4.82$, $p < 0.001$, $r = 0.39$; U15, $Z = 4.42$, $p < 0.001$, $r = 0.36$;
 223 U17, $Z = 4.05$, $p < 0.001$, $r = 0.33$; U20, $Z = 4.15$, $p < 0.001$, $r = 0.34$.



224

225 *Figure 1. Coaches' and parents' perceptions of the percentage of current top 20 ranked senior*
 226 *athletes ranked in the top 20 at each age grade during their youth participation.*

227

228 Qualitative comments provided to rationalise answers to this question were grouped into
 229 three themes. Both coaches and parents suggested that dropout, due to a variety of reasons, was
 230 responsible for the low percentage of U13s and U15s who were also high performing senior
 231 athletes: *"There is a big dropout at U20 due to work, college and relationships. Also injuries are*
 232 *more severe at that age and only those with a strong mentality will continue"* (Participant 36;
 233 coach); *"I am aware of a significant drop off for young athletes from the sport for various*
 234 *reasons. Such as competing priorities, lack of development or success, injury, loss of interest in*

235 *the sport*” (Participant 109; parent). The second reason provided by both coaches and parents
236 was that many successful seniors were relatively late entrants to the sport: *“I understand many*
237 *top athletes are discovered at university level - often participating in other sports first”*
238 (Participant 140; parent); *“I think the top ranked athletes have always been good at sport but not*
239 *necessarily in athletics”* (Participant 38; parent). Finally, both coaches and parents described
240 how early advantages, due to early development or early specialisation, wash out over time
241 resulting in different individuals achieving success: *“children grow and develop at different*
242 *rates - a fully grown U13 might peak at age 12 whereas a later developer would have success*
243 *later”* (Participant 79; parent); *“most early bloomers, due to genetics, find the desire and hard*
244 *work required as they mature onto a more level playing field, less appealing after their successes*
245 *at junior level”* (Participant 67; coach). Thus, although there were differences between coaches
246 and parents in terms of the quantitative predictions of all respondents, those parents and coaches
247 who were able to provide a rationale for their answers were largely in agreement.

248 **Perceptions of factors contributing to youth success**

249 Analysis of the factors that participants identified as being primarily responsible for
250 success in youth track and field competitions are presented in Table 2. The five most commonly
251 reported themes were shared by parents and coaches, although the order in which themes
252 appeared differed. Items clustered under the theme ‘Attitude, Dedication and Desire’ were the
253 most commonly reported by both coaches and parents (e.g., “Personal drive/attitude”;
254 “Dedication to training”). The most pronounced difference was with respect to ‘Relative
255 development’; example statements include “Physical development for age” and “Physically
256 mature for their age”. While 19% of coaches identified this factor within their top three, only
257 8% of parents did so. Parents were also more likely to suggest the ‘Coach’s influence’ (e.g.,

258 “Quality coaching”, “Access to a coach”) and ‘Ability’ (e.g., “Genetics”, “Natural ability”) as
 259 key contributory factors in youth success compared to coaches.

260 Table 2

261 *Parent and coach perceptions of the factors primarily responsible for athlete success in youth*
 262 *track and field competitions*

| Theme | N factors | | % factors | |
|-----------------------------------|-----------|-------|-----------|-------|
| | Parent | Coach | Parent | Coach |
| Attitude, Dedication and Desire | 81 | 35 | 23.7 | 23.0 |
| Coach Influence | 63 | 19 | 18.4 | 12.5 |
| Ability | 61 | 18 | 17.8 | 11.8 |
| Family environment | 39 | 12 | 11.4 | 7.9 |
| Relative development | 27 | 29 | 7.9 | 19.1 |
| Training history | 26 | 10 | 7.6 | 6.6 |
| Social Environment | 18 | 5 | 5.3 | 3.3 |
| Enjoyment | 9 | 8 | 2.6 | 5.3 |
| Unspecified environmental feature | 8 | 2 | 2.3 | 1.3 |
| Physical Environment | 6 | 5 | 1.8 | 3.3 |
| General athleticism | 2 | 5 | 0.6 | 3.3 |
| Technical competence | 1 | 2 | 0.3 | 1.3 |
| Miscellaneous factors | 1 | 2 | 0.3 | 1.3 |

263 *Note:* Each participant was asked to identify three factors responsible for success.

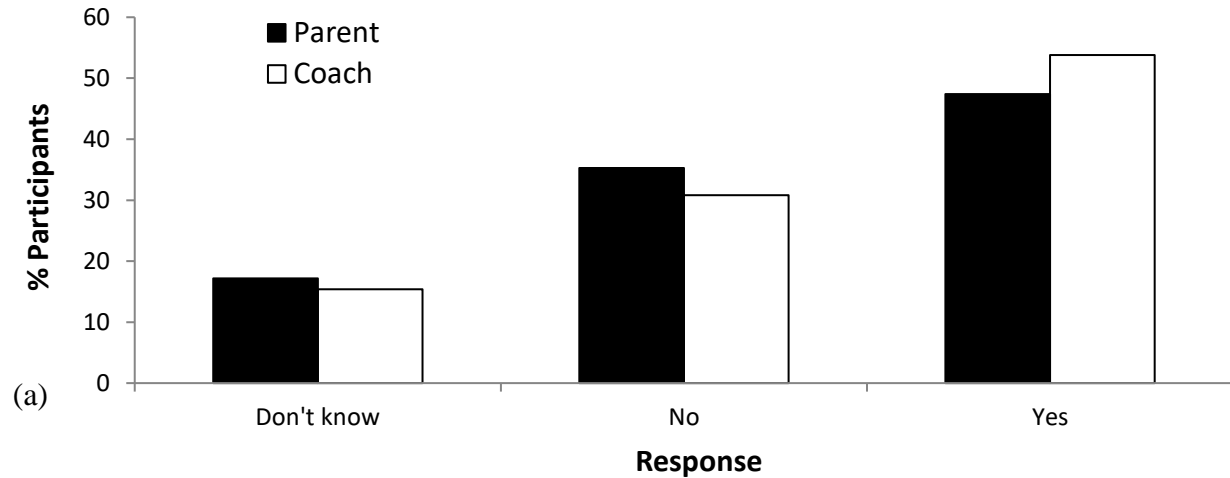
264 While less than one fifth of coaches or parents identified relative development as a factor
 265 primarily responsible for youth success in response to the open question, figure 2 illustrates that
 266 approximately half of parents and coaches were aware of the relative age effect when explicitly
 267 asked about it. There was no significant different in knowledge between groups; $\chi^2 = 0.597$, $p =$
 268 0.742 , $V = 0.06$. Both parents and coaches connected this advantage to additional growth
 269 relative to their later born peers; for example:

270 In a child 6-11 months older than a competitor can make a significant difference in
 271 physical growth and strength (height and leverage) i.e., a September baby has an
 272 advantage over a Summer baby with regard to how age groups in athletics are grouped
 273 (Participant 31; coach)

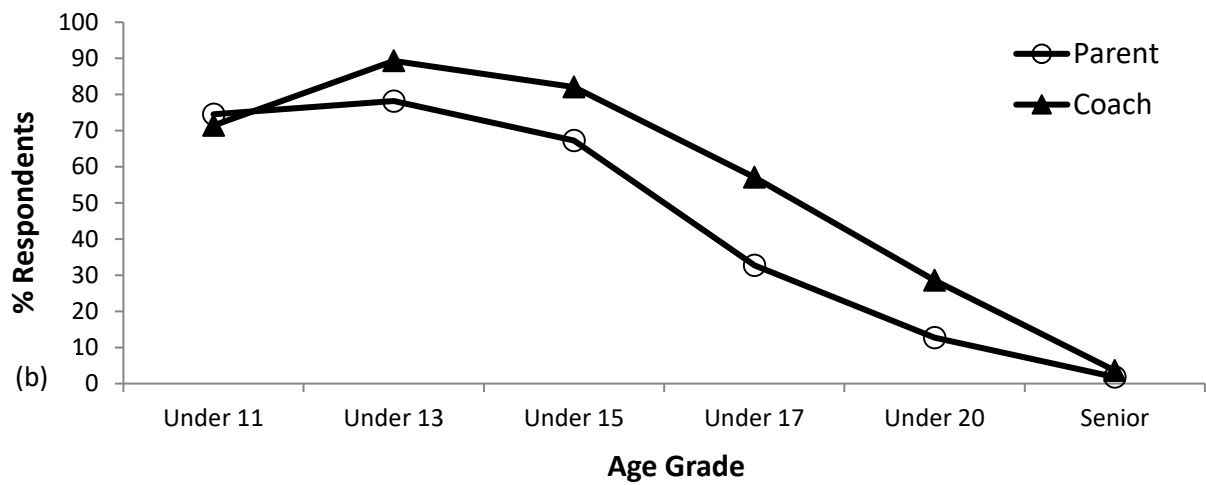
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275 Almost a year older than some in the same year group. Would be more developed
276 mentally & physically than younger children (Participant 26; parent).

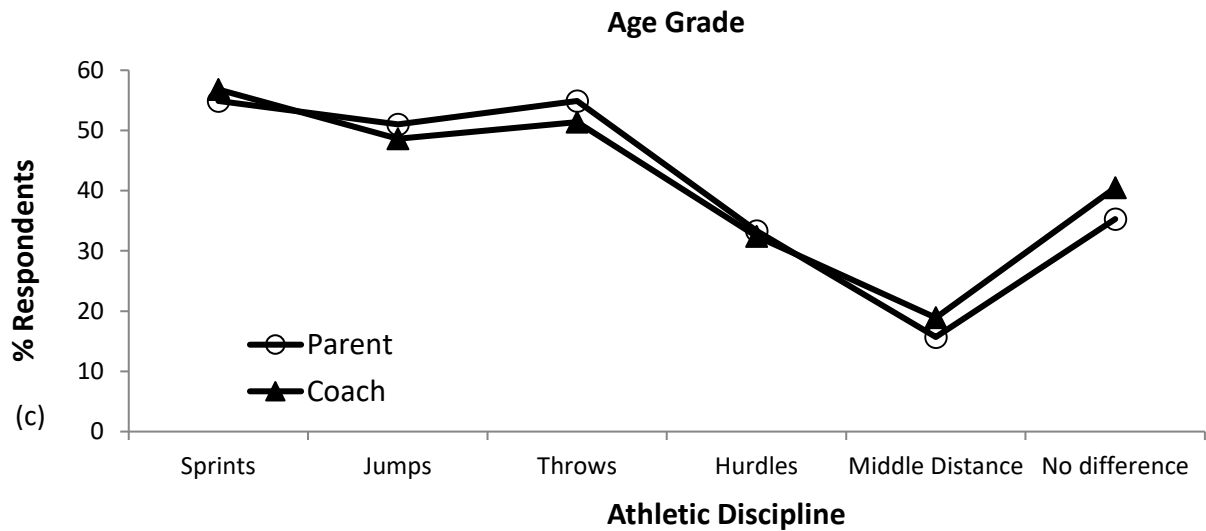
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Figure 2. Parents and coaches' response to the question asking if date of birth influenced success in youth track and field (a); perceptions of which age grades are most impacted by relative age effects (b); and perceptions of which event groups are most effected by relative age effects.

285 Figure 2 further illustrates that of those parents and coaches who were aware of the
286 relative age effect, the majority perceived that the effect was most prominent between U11 and
287 U15. Furthermore, both coaches and parents predominantly perceived that relative age effects
288 were most prominent in the sprints, jumps and throws, and least prominent in the middle distance
289 events.

290 **Perceptions of optimal development activities**

291 Table 3 presents information relating to beliefs about optimal developmental activities for
292 adolescent athletes. Coaches' and parents' beliefs about when athletes should begin year round
293 training for track and field athletics differed, $\chi^2 = 29.73$, $p < 0.001$, $V = 0.42$. The majority of
294 parents (37.4%) reported that youth athletes should start year round training at U15. In contrast,
295 the majority of coaches (46.2%) advocated year round training beginning at U17. However,
296 21% of parents advocated beginning year round training at U13 and a further 8% advocated
297 starting at U11; only 8% of coaches recommended beginning year round training at U13 or
298 earlier.

299

300 Table 3
 301 *Parent and coach perceptions of optimal development activities for youth athletes*

| | Age Grade | | | | | |
|---|-----------|---------|---------|---------|---------|---------|
| | U11 | U13 | U15 | U17 | U20 | Senior |
| Age at which athletes should start training year round* | | | | | | |
| % Parent | 7.8 | 20.9 | 37.4 | 29.6 | 4.3 | 0 |
| % Coach | 3.8 | 3.8 | 19.2 | 46.2 | 26.9 | 0 |
| Age at which athletes should specialise in one sport* | | | | | | |
| % Parent | 0.9 | 2.6 | 27 | 37.4 | 20.9 | 11.3 |
| % Coach | 0 | 1.9 | 5.8 | 38.5 | 40.4 | 13.5 |
| Age at which athletes should specialise in a single event | | | | | | |
| % Parent | 0.9 | 10.1 | 17.4 | 39.4 | 26.6 | 5.5 |
| % Coach | 0 | 2.1 | 10.4 | 43.8 | 35.4 | 8.3 |
| Percentage (Mdn, IQR) of practice which should prioritise enjoyment rather than improvement | | | | | | |
| Parent | 90 (20) | 70 (20) | 50 (20) | 30 (30) | 20 (30) | 20 (25) |
| Coach | 90 (20) | 75 (20) | 60 (20) | 40 (20) | 25 (25) | 10 (30) |

302 Note: *Significant difference between the views of coaches and parents. Mdn = median. IQR =
 303 Inter-quartile range.

304 Reasons for when to begin year round training were broadly similar between coaches and
 305 parents, and focused on three key themes. The first concern was that the decision be based upon
 306 individual characteristics such as maturation or engagement in other sports rather than age:
 307 *“Very hard to generalise on this. Different individuals have different development tracks -*
 308 *physical/psychological/motivational”* (Participant 53; coach); *“A lot can depend on particular*
 309 *growth of individual. All athletes develop at different stages”* (Participant 136; parent);
 310 *“Depends on other sport participation. Example a competitive road cyclist could do that in*
 311 *summer and cross country running in winter. Endurance development would be sustained,*
 312 *athlete would have variety”* (Participant 35; coach).

313 The second theme was that year round training could be appropriate during early
 314 adolescence provided it focused on general training, delivered through fun activities and games,

315 and was of an appropriate intensity: “*General training younger than U15 is fine, but not specific*
316 *event training alone*” (Participant 46; coach); “*I believe you MUST start training for your event*
317 *as early as possible. However the training at a young age MUST also be very fun and not*
318 *completely technique based as to avoid athlete burnout*” (Participant 28; coach); “*can start*
319 *earlier without adverse effect if intensity not too high*” (Participant 47; parent).

320 The final theme related to the respondents’ different conceptualisations of track and field
321 athletics. Two coaches described how athletes typically peaked late in their development
322 (“*athletics is shown to be a late development sport*”, Participant 62), while three parents and one
323 coach emphasised the advantages of early year round engagement (“*earlier you start the better*”,
324 Participant 152).

325 The majority of coaches advocated specialisation in one sport in late adolescence (U17 or
326 later), with the largest percentage (40.4%) recommending specialising during the U20 age grade.
327 Parents were more likely to recommend specialisation within early adolescence (30.4%
328 recommending specialisation at U15 or earlier); $\chi^2 = 13.14$, $p = 0.004$, $V = 0.28$. Although Table
329 3 reveals that the pattern of results for specialising in a single event within athletics was similar
330 to the results for between sport specialisation, the distributions were not significantly different; χ^2
331 $= 5.01$, $p = 0.082$, $V = 0.18$.

332 No qualitative comments were provided to rationalise between- or within-sport
333 specialisation at U13 or younger, while the only comments that were provided to support
334 specialisation at U15 either suggested that continued engagement in “complimentary” sports was
335 acceptable, or emphasised the need to experience a range of sports before that point: “*can*
336 *continue some other sports if complimentary to athletics training eg swimming*” (Participant 32;

337 *parent); “youths should have time to experience a range of sports and so specialise too early*
338 *would not allow that” (Participant 146; parent).*

339 The majority of comments related to the benefits of multi-sport and/or multi-event
340 participation up to at least late adolescence. Reported benefits of multi-sport included general
341 conditioning, personal development, prevention of injury, prevention of staleness, and keeping
342 an individual’s sporting options open: *“Keep all doors open. Physical skills are transferable*
343 *across sports disciplines”* (Participant 60; parent); *“I think it is important to maintain a healthy*
344 *interest in other sports and even at the stage when a specific athletic event becomes the athletes*
345 *focus; doing other activities can help recovery and prevent staleness”* (Participant 48; coach); *“I*
346 *think young athletes should experience a variety of sports to develop as a person as well as an*
347 *athlete. I also believe that it helps developing different group muscles and prevent injuries”*
348 (Participant 166; parent). However, both parents and coaches indicated that the additional sport
349 needed to compliment track and field: *“if the other sport is complimentary, especially if non*
350 *contact, it may be useful to keep some aspects of the training if time permits”* (Participant 67,
351 coach); *“swimming is good for recovery so would not recommend giving up”* (Participant 21,
352 parent). Similarly, multi-event participation was seen as keeping an athlete’s options open,
353 reducing the risk of injury, facilitating being part of a team, and avoiding demotivation if
354 performances stagnated. However, one coach emphasised that balance should be achieved
355 across sports, not just within sports:

356 it doesn't mean they must do different kinds of athletics such as jumps and throws as well
357 as running if they like running. Kids can do other sports BESIDES [emphasis
358 respondent’s] athletics such as cycling, swimming, rugby. So they shouldn't be forced

359 into doing hurdles and jumps if they don't want to do it just to please the multi event
360 enthusiasts whose horizons don't extend beyond the athletics arena (Participant 34; coach)

361
362 Finally, participants were asked to indicate the extent to which they believed that training
363 sessions should emphasise immediate enjoyment or improvement. Table 3 illustrates that both
364 coaches and parents emphasised immediate enjoyment at younger ages, gradually shifting to a
365 primary emphasis on improvement at later age grades. A balanced approach was recommended
366 by both parents and coaches, however, in that some emphasis on both immediate enjoyment and
367 on long term improvement was deemed appropriate at all age grades. As the data was not
368 normally distributed, Bonferroni-Holm corrected Mann Whitney U tests were used to compare
369 the values reported by coaches and parents; as the initial critical value was $p = 0.008$ ($0.05/6$), no
370 significant differences were apparent: U11, $Z = 2.06$, $p = 0.039$, $r = 0.13$; U13, $Z = 1.70$, $p =$
371 0.090 , $r = 0.20$; U15, $Z = 2.57$, $p = 0.031$, $r = 0.16$; U17, $Z = 0.898$, $p = 0.369$, $r = 0.07$; U20, $Z =$
372 0.473 , $p = 0.363$, $r = 0.07$; Senior, $Z = 0.867$, $p = 0.386$, $r = 0.04$.

373 Three themes emerged from the qualitative comments relating to the emphasis on
374 immediate enjoyment versus long term improvement. Firstly, both coaches and parents
375 discussed the reciprocal relationship between enjoyment and improvement: "*enjoyment =*
376 *motivation = dedication = performance*" (Participant 130; parent); "*may not enjoy if don't*
377 *improve, will not improve if don't enjoy*" (Participant 95; coach); "*Enjoyment is essential to*
378 *improvement, and to retain an athlete in the sport*" (Participant 54, coach). Secondly, both
379 parents and coaches commented that serious activities can still be fun: "*the right exercise can be*
380 *enjoyable and promote improvement*" (Participant 124, parent); "*serious activities can still be*
381 *fun especially in a good training group*" (Participant 115, coach). Finally, both parents and

382 coaches highlighted that the ratio of playful activities: serious practice was individual dependent:
383 *“Within the younger groups there will be some athletes who require more play than*
384 *development, but also there will be some who require more development than play”* (Participant
385 18, coach); *“Depends hugely on the individual child and their attitude. Some young children*
386 *know running training is for improvement and do not need the distraction of games as they enjoy*
387 *their training anyway”* (Participant 32, parent).

388 **Discussion**

389 Coaches and parents were found to hold differing perspectives in relation to optimal youth
390 development in track and field athletics. Compared to coaches, parents were more likely to
391 believe that successful adults had achieved success during early adolescence, and to connect that
392 success to innate ability rather than relative development. However, there was no difference in
393 the proportion of parents and coaches who reported familiarity with the relative age effect
394 (approximately 50%). The most striking differences between coaches and players were in
395 relation to optimal youth development practices, with parents more likely to encourage year
396 round training at an earlier age, and giving up other sports at an earlier age. Qualitative responses
397 revealed nuanced views relating to specialisation in youth sport.

398 Coaches’ beliefs about the proportion of successful adults who were also successful at the
399 Under 13 and Under 15 age grades were in line with research which has examined the
400 relationship between adolescent and later success in the context of track and field athletics^{5, 47}.
401 Conversely, relative to the results of Kearney and Hayes⁵, coaches tended to underestimate the
402 proportion of older adolescents who were successful at U17 and U20 and who then progressed to
403 national senior success. However, coaches’ conservative predictions were in line with older
404 studies that examined the progression of world junior finalists^{47, 48}. For example, Pizzuto et al.⁴⁷

405 found that 42.7% of finalists in the middle and long-distance events at the World Junior
406 Championships were considered as dropouts from high-level performance two years later. Thus
407 it appears that coaches' generally hold accurate perceptions about the relationship between youth
408 and adult success.

409 In contrast to coaches, parents' tended to over-estimate the proportion of successful
410 adults who were also successful as young adolescents. A closer examination of the qualitative
411 comments revealed that those respondents (all parents) who suggested that a high proportion of
412 successful U13s would progress to success at senior level did not provide any rationale for their
413 answer. As documented in the results section, parents who could provide a rationale were likely
414 to provide answers consistent with a weak relationship between youth and later success. Thus, it
415 appears that additional educational initiatives are required to inform parents of the weak
416 relationship between performances during early adolescence and subsequent success.

417 These educational initiatives should focus on addressing parents' beliefs about the factors
418 contributing to youth success. The fact that less than 20% of parents and coaches identified
419 relative development as a key factor in youth success, and that only 50% were familiar with the
420 relative age effect, suggests that increased emphasis on relative development is required in parent
421 and coach education. Research has consistently identified an over-representation of early
422 maturing athletes in a range of high performance youth squads⁴⁹, including track and field¹⁶. The
423 false equation of early maturation with potential for future success is suggested to be one of the
424 reasons why relative age effects appear so prominently in youth sport¹⁵ and in track and field in
425 particular^{17, 18}. However, simply raising awareness of differences in relative development is
426 unlikely to be sufficient to change behaviour⁵⁰. Policy changes such as age restrictions on when
427 athletes could be invited to selection events⁵¹, the use of alternative supplemental competition

428 structures (e.g., bio-banding⁵²) or additional supports such as corrective-adjustment procedures⁵³,
429 ⁵⁴ or allocating uniform numbers on the basis of relative age or maturation status⁵⁰ are likely to
430 be required to assist parents and coaches in addressing maturation-related issues in youth sport.
431 Due to the use of objective outcome measures in track and field (i.e., time, distance), corrective
432 performance adjustments may be a particularly appropriate strategy to better inform coaches,
433 parents and athletes themselves when evaluating performance. Coaches, clubs and federations
434 need to reflect on how these strategies might be implemented within a track and field context⁵⁵.

435 Educational initiatives should also focus on identifying healthy youth sport practices. Both
436 parents and coaches advocated an overall framework for youth sport in which the primary
437 emphasis within training gradually shifted from immediate enjoyment (i.e., deliberate play⁵⁶) to
438 long term improvement (i.e., deliberate practice⁵⁷). This gradual change in emphasis is
439 consistent with analyses of the developmental pathways of successful athletes^{19, 20, 58}. However,
440 examining more specific elements of the youth sport experience, significant differences between
441 the views of parents and coaches were revealed. Specifically, parents believed that athletes
442 should (a) begin training year round for a sport, and (b) specialise in a single sport, at a younger
443 age than advocated by coaches. These findings are consistent with previous research showing
444 that the recommendations associated with youth sport participation are not well known by
445 parents^{6, 29}. Year round engagement in training for one sport and premature specialisation in a
446 single sport are two factors which are suggested to increase an athlete's risk of injury and/or
447 burnout^{59, 60}. Consequently, a range of professional bodies have proposed guidelines to assist
448 parents and coaches to implement healthy youth sport practices^{1, 2}. Such guidelines should form
449 the basis for educational initiatives aimed at promoting healthy engagement in youth sport.

450 While the professional body guidelines provide appropriate general advice, the
451 explanations provided by parents and coaches for their beliefs about youth sport practices
452 suggest that more nuanced instruction is required on translating these general guidelines into
453 individual applications. For example, and consistent with international recommendations^{1,2}, the
454 United Kingdom Athlete Development Model⁶¹ advocates that season length should be restricted
455 to approximately six months for 12 year old athletes, gradually increasing to year round training
456 over the course of adolescence. In addition, the model recommends that the ideal developmental
457 path for all athletes under 15 years of age is to engage in multi-event training and competition.
458 However, and consistent with previous research⁶², when explaining their rationale for the youth
459 sport practices that they endorsed, several respondents offered nuanced interpretations of such
460 broad recommendations. For example, several respondents suggested that year-round training
461 within a sport such as track and field was not problematic at a young age so long the emphasis
462 was on general rather than event specific training. One coach presented a particularly clear
463 argument in favour of ensuring that a child had a balanced experience *across* different sports,
464 rather than emphasising that a child experienced the full range of disciplines within track and
465 field athletics. To date, there is a paucity of research examining nuanced features of optimal
466 athlete development activities such as year-round training and single event specialisation within
467 track and field athletics^{39,40,63}. While extensive research exists to illustrate that athletes can
468 follow a diversity of pathways to expertise¹⁹⁻²³, additional research is required to explore the
469 consequences of specific youth sport practices, so that more nuanced guidelines may be provided
470 for parents and coaches.

471 For successful athlete progression, parents' and coaches' perceptions of optimal
472 development activities need to be aligned^{34,64}. Consistent with previous research³³, this study

473 found that parents and coaches may hold discrepant views relating to certain aspects of talent
474 development. Thus, in addition to enhancing knowledge about effective talent development,
475 educational initiatives should also emphasise how stakeholder coherence might be enhanced^{34, 64}.
476 To achieve this, educational workshops might focus on initiating and maintaining positive coach-
477 parent relationships through considering issues such as coach selection, role clarity and
478 communication strategies³². Furthermore, the factors that influence youth sport outcomes vary
479 depending upon the level of the sport (i.e., recreational versus competitive⁶⁵), as do the demands
480 and roles of key stakeholders³². Consequently, educational initiatives should be bespoke to the
481 motivations of participants.

482 As the single largest predictor of sustained participation and sport commitment⁶⁶,
483 enjoyment is one topic on which more detailed and more nuanced guidelines may be provided
484 for parents and coaches. Enjoyment is a complex construct. For example, in Fun Integration
485 Theory⁶⁶, Visek and colleagues have identified 11 fun dimensions (e.g., learning and improving,
486 friendships, positive coaching) comprised of 81 specific fun determinants (e.g., learning new
487 skills; being around your friends; having well-organized practices). Both coaches and parents
488 showed a general appreciation for this complex conceptualisation of enjoyment by recognising
489 the need to balance a focus on enjoyment and long term improvement at all ages, and through
490 their qualitative comments on what constitutes enjoyment within track and field. An advantage
491 of Fun Integration Theory as opposed to alternative models is the detailed framework it offers to
492 further educate parents and coaches about the specific actions they can undertake to positively
493 influence the youth sport experience. In particular, the theory's fun maps provide a rich stimulus
494 for discussion which might underpin coach education workshops.

495 A strength of this study was the explicit connection between the questions used in the
496 survey, and recent quantitative analyses of the development of track and field athletes within the
497 United Kingdom^{5, 18, 39, 40}. However, this study has several limitations. Firstly, due to the desire
498 to align the questions with previous research on this population, additional themes relating to
499 youth sport practice such as training volume and intensity^{59, 63} or the ratio of organized sports to
500 free play time⁶⁷ were not considered. Secondly, selection bias is an obvious concern with survey
501 research. Both parents and coaches may have been more inclined to participate in the survey if
502 they were concerned about the topic, or if they felt they held views consistent with national
503 governing body policy. Finally, the use of a survey method limited the amount of detail that
504 could be obtained on why parents and coaches believe what they believe. Obtaining a more in-
505 depth understanding of the reasons underpinning parents' and coaches' beliefs and practice
506 should prove beneficial in guiding the various educational initiatives proposed above.

507 **Conclusion**

508 In conclusion, coaches and parents were found to hold contrasting perceptions of optimal
509 youth development activities in track and field athletics. Educational initiatives should focus on
510 the relationship between youth and adult success, the role of relative development in youth
511 success, and communicating the rationale underpinning healthy youth sport practices. However,
512 research should also focus on developing a more detailed understanding of healthy youth sport
513 practices to provide more nuanced guidance to practitioners.

514

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