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Researchers who study the relative age effect (RAE) have stated that, within a given cohort, individuals who are relatively older tend to be over-represented at elite levels within sport. This RAE has been illustrated in hockey,1 soccer,2 and baseball,3 to name a few.

Recently, Baker and Logan4 conducted an analysis on the birth dates of players drafted to the National Hockey League (NHL) between 2000 and 2005. The results led them to conclude that a RAE existed, as relatively older players were over-represented in the NHL drafts. After appraising their contribution, we feel that there are three key points to be reconsidered. These considerations do not disqualify the notion that a RAE exists in NHL draftees; however, they compel one to re-examine study design issues and the interpretation of results.

QUARTILES AND SAMPLE

The first point for reconsideration concerns the birth quartiles used by the authors. Specifically, Baker and Logan4 divided their sample into quartiles (Q) based on the calendar year for US and Canadian hockey, which is 1 January to 31 December (Q1 = January to March, Q2 = April to June, Q3 = July to September, Q4 = October to December). The NHL draft calendar, however, runs from 16 September to 15 September. For example, in the 2008 NHL draft, first-year eligible players were born between 16 September 1989 and 15 September 1990.

Thus, the relatively oldest players in an NHL draft cohort are born on 16 September. In light of this evidence, birth quartiles for NHL draftees should be: Q1 = 16 September to 15 December, Q2 = 16 December to 15 March, Q3 = 16 March to 15 June, Q4 = 16 June to 15 September.

Our second contention includes two main issues regarding sampling. First, we argue that only first-year eligible players should be included in the analysis as it is possible for previously undrafted players to re-enter the NHL draft at a later time. Archived numbers from the NHL show that this phenomenon is not trivial, as 302 of the players drafted between 1998 and 2007 went undrafted in their first year of eligibility. Draftees who are not first-year eligible represent a population that is not the best of the elite; otherwise, they would have been chosen in the previous draft.

Along these same lines, Baker and Logan4 included draftees from all seven rounds of the NHL draft. Alternatively, we propose that only select rounds of the draft should be used to make an assessment of the RAE in this cohort. We analysed the draft data from 1989 to 1998 to determine the percentage of players who played at least 82 games (one full season), cumulatively, in their NHL careers. While 76%, 43%, 35%, and 29% of the draftees from rounds one to four, respectively, played at least one season, rounds five to seven had less than a quarter of the draftees play at least 82 career games (18%, 22%, and 13%, respectively). Thus, we suggest that only rounds one to four should be included in analysis, as rounds five to seven do not adequately represent the quality of hockey players who succeed in the NHL.

With these considerations in mind, we analysed draft data from 1998 to 2007 (as compared with Baker and Logan,4 who analysed from 2000 to 2005) provided on the NHL website (http://www.nhl.com) and included all first-year eligible players who were drafted in rounds one to four. The resultant sample included 968 male athletes. Birth dates were collected from the NHL website and athletes were placed into the aforementioned revised birth quartiles.

Baker and Logan’s4 results indicated a significant bias for athletes born in the first half of the calendar year ($\chi^2 = 96.5, p<0.001$). With our revised quartiles, similar to Baker and Logan, the $\chi^2$ analysis also showed that the two oldest quartiles had significantly more draftees ($\chi^2 = 4.1, p<0.05$) than expected (see fig 1). More importantly, this effect was largely driven by the results of the second quartile. In fact, in a second $\chi^2$ analysis, Q2 and Q3 were compared with Q1 and Q4. Q2 and Q3 combined to have a significant over-representation of draftees ($\chi^2 = 64.4, p<0.001$) with 63% of the athletes coming from those two quartiles (16 December to 15 June). This last fact is of particular interest, because the relatively older athletes for the draft are in Q1, which, according to previous RAE literature, should have shown an over-representation of those athletes. The finding that Q2 and Q3, which are actually the quartiles associated with the standard RAE found in hockey,2 have the most athletes, suggests that relative age advantages gained by players during their minor hockey careers continued to pervade through their NHL draft years. Thus, it can be said that a RAE exists in NHL draftees; however, it is not related to being the relatively oldest players in the NHL draft cohort (16 September), but rather it is likely derived from being the relatively oldest players in the standard competition cohort used throughout youth and adolescent hockey (1 January).

CORRELATIONS

The third point for consideration concerns the Spearman rank-order correlations conducted by Baker and Logan4 on birth quartile and the round of the draft in which athletes were selected. In particular, we argue that a more precise index is desirable. For example, consider that being selected 30th overall (round one) and 31st overall (round two), or being selected first overall (round one) and 60th overall (round two), are both considered

![Figure 1 NHL draftees by birth quartile, 1998–2007. Note: Q1 = 16 September to 15 December; Q2 = 16 December to 15 March; Q3 = 16 March to 15 June; Q4 = 16 June to 15 September.](http://bjsm.bmj.com/)

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just one round apart. We contend that a Spearman rank-order correlation should be conducted on birth quartile and overall draft pick number, not round. Using our sample of 963 draftees, a Spearman rank-order correlation was conducted for draft pick number and birth date. No significant relationship was found ($p>0.25$).

These results are contrary to the findings by Baker and Logan, who found a significant relationship that indicated younger athletes were selected earlier in the draft. Thus, while an athlete’s relative age may dictate whether one gets drafted, it cannot predict where an elite hockey player will rank within an NHL draft.

**SUMMARY**

Baker and Logan concluded that RAE did affect the likelihood of an athlete achieving elite levels of performance. We ultimately agree with their statement, but wish to amend it based on our results. The RAE does exist within the oldest NHL draftees, but it is those players who were relatively oldest throughout their minor hockey careers who hold an even larger advantage throughout their NHL draft year. As a practical example, a child born in January, who starts playing hockey at age 5, would be relatively older than most of his hockey peers from age 5 until age 17, when he becomes eligible for the NHL draft. The RAE that is ingrained within the sport up to this point has enabled him to become one of the top athletes in the draft cohort and thus facilitates his success at the NHL level.

**Competing interests:** None.

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