The Relative Age Effect and Academic Timing in College Baseball

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ABSTRACT

Background/Purpose
Previous research has suggested that older athletes within the same age grouping are often perceived to be more talented simply due to advanced maturity. This perception leads to biased selection and skewed participation rates favoring the oldest participants within the group. This resulting skewed distribution is termed Relative Age Effect (RAE). Further, academic institutions often group their participants according to their academic status, not strictly by age. This factor, termed Academic Timing, can result in the ages of competitors spanning more than a single calendar year. Therefore, our purpose was to investigate whether RAE influenced the selection of junior college baseball participants, and study whether Academic Timing influences the formation of RAE.

Method
The age in months of 150 baseball players from the roster of a junior college located in the Midwestern United States was collected.

Results
Without consideration for Academic Timing, RAE was not found to cause significant selection differences [χ^2 (3, n = 150) = 3.97, p = 0.26]. However, when the effect of Academic Timing was considered, a significantly larger proportion of older athletes was selected [χ^2 (5, n = 150) = 6.83, p = 0.009].

Conclusions
The results of this study indicate RAE could bear more influence among American student-athletes than was previously reported. These findings suggest that, when combined with Academic Timing, the RAE significantly influences the selection of collegiate athletes. Academic Timing should be considered whenever the RAE is investigated among academic institutions.

INTRODUCTION & BACKGROUND

Purpose
1. To investigate whether RAE influenced the selection of junior college baseball players
2. To investigate whether considering Academic Timing aids in the recognition of RAE

Research Hypotheses
- RAE will not be found among junior college baseball players when investigated using traditional means, which considers only month after birth;
- When the subjects are evaluated based on their Academic Timing, which additionally considers their year of birth, significant differences in birth rate distributions will be evident.

Origins of RAE Research
- Season of Birth
  - Began with observing different birth rates in congruence with seasonal changes in climate
  - Found links between timing of birth and insanity, TB, and schizophrenia
- Academics
  - Initially believed that birth season might influence intelligence
  - Later discovered that performance appeared to be more influenced by relative age than birth season

Transition Into Athletic Domain
- 1984 (Grondin et al.) & 1985 (Barnsley et al.)
  - Research suggested relatively older athletes were more often selected for competitive teams
- According to Cobley, Baker, et al., 2009
  - 38 studies from 1984 to 2007
  - 14 sports in 16 countries
    - Limited research involving college athletes
    - Decreased incidence among American athletes

Findings from Athletic Studies
- Physical maturity is a factor
  - Competitions where physical maturity is detrimental have not exhibited RAE
  - RAE persists beyond peak maturity, however
- Competitive environment is necessary
  - RAE is more likely if there is a greater number of athletes competing for the position/spot on a team
  - Suggested that sports with multiple and varied positions are less likely to develop RAE

Findings from Athletic Studies
- RAE can result from accumulation of influences over a number of years
  - Increased hours of practice/quality of facilities
  - Better coaching/more advanced methods
  - Exposure to greater levels of competition

MATERIALS & METHODS

Subjects
- 150 junior college baseball players
  - competed during the spring seasons from 2003 – 2010 (8 teams)
- Subjects entered college between 2001 and 2009 (9 academic classes)

Procedures
- 298 pre-participation physicals
  - Grouped by year
  - Gathered name and d.o.b. from each physical
  - Physical required to participate in any baseball activity
    - Not all who submitted physical were included on the team
  - Required to be renewed yearly
    - Single subject could have multiple physicals
- Names from each yearly grouping of physicals compared to team roster
  - 241 "roster" players, 57 "non-roster"
  - Rosters were also used to help establish and verify year of college entry
- Each year's roster also compared to other rosters
  - 83 players listed on 2 rosters
  - 4 players listed on 3 rosters (resulting in 8 duplicates)
    - 241 – (83 + 8) = 150
- 18 players appeared in both roster and non-roster groups
- Roster group assigned 4 digit numbers that began with 1
  - 1xxx
- Non roster group assigned 4 digit numbers that began with 2
  - 2xxx
- 18 players appearing in both groups were numbered first given matching final 3 digits
  - 1501 – 1518 and 2501 – 2518
- Remainder of subjects given unique final 3 digits
  - 1519 – 1650 and 2651 – 2689
- Names removed, leaving only 4 digit IDs with associated year and month of birth

Data analysis – Traditional Evaluation
- Considered only subject's month of birth
- Divided into 4 groups
  - Q1 – Aug, Sept, and Oct birth months
  - Q2 – Nov, Dec, and Jan birth months
  - Q3 – Feb, March, and April birth months
  - Q4 – May, June, and July birth months
- Used chi square to compare observed birth rate distribution to an expected even birth rate distribution which assumed 25% of births in each quartile grouping

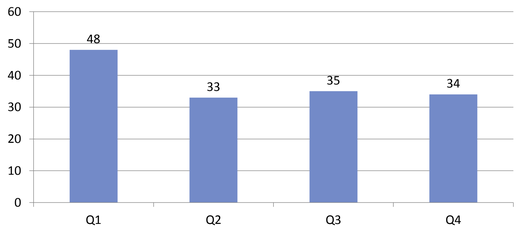
Data analyses – Academic Timing
- Maintained expected participation year, but recognized that some athletes were born outside of their expected birth year
  - Expected birth year established based on year of college entrance
  - Subjects, 114 of the 150, born within the expected birth year were grouped as Q1, Q2, Q3, and Q4 as previously described
- Q0: Born before August of expected birth year
  - Q0 added to Q1 and Q2 to form Group X, participants born prior to the midpoint of the participation year
- Q5: Born after July of expected birth year
  - Q5 added to Q3 and Q4 to form Group Y, participants born after the midpoint of the participation year
- All participants
  - Used chi square to compare observed birth rate distribution (Group X and Group Y) to an expected even birth rate distribution which assumed half of births prior to and after the midpoint of the participation year
- On-Time participants
  - Involved only 114 participants born within expected year of birth, used chi square to compare observed birth rate distribution to an expected even birth rate distribution which assumed 25% of births in each quartile grouping

RESULTS

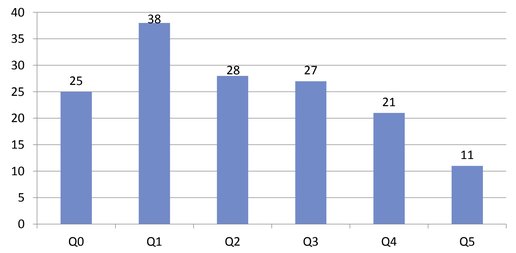
Traditional Evaluation

$\chi 2$ (3, n = 150) = 3.97, p = 0.26

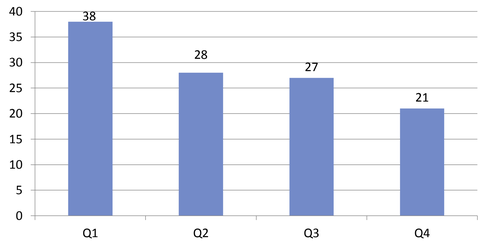
- Q1 = Greatest number of births while other 3 Q groups are evenly distributed
- Q1 = Only group containing greater number of births than expected (37.5%)
- 54% in Q1 + Q2
- Q1 > Q4



Academic Timing – All Participants
- $\chi 2$ (1, n = 150) = 6.83, p = 0.009*
- 60.7% born prior to midpoint of year



Academic Timing – On Time Participants
- $\chi 2$ (3, n = 114) = 5.23, p = 0.156
- Linear decline from Q1 to Q4
- 57.9% born in first half of participation year
- Q1 > Q4



DISCUSSION

- The first hypothesis – RAE would not be detected by traditional means of investigation – was supported
  - Superficial indicators of RAE were present
    - Q1 largest grouping while others were evenly distributed
    - Q1 was greater than Q4
- The second hypothesis – When considering the influence of Academic Timing, RAE would be found – was partially supported
  - Half year evaluation of Group X and Group Y was statistically significant
  - On-Time Participants showed a linear decline from Q1 to Q4
- 24% of the subjects were born outside of the expected participation year
  - Possible explanation for previous lack of RAE findings among American athletes
  - American athletic leagues often associated with academic institutions
  - Participation is not strictly governed by date of birth
- RAE can be seen as matter of public health as athletic leagues provide opportunities for America's youth to participate in physical activity
- Skewed distribution in favor of the oldest among a group indicates decreases in the numbers of the youngest
- What steps can be taken?
  - Education – Promote awareness of RAE among league organizers, coaches, parents, etc.
  - Restructure youth leagues
    - Alternate means of grouping
      - Height, weight, H/W ratio etc.
    - Quotas – require birth date distributions to be even
    - Alter length of participation year
      - Avoid 12 month increments so age-preference varies from year to year
    - Avoid selecting elite teams early in the year – and not at all among younger age groups
    - Within communities, vary definition of participation year between sports
- Baseball leagues may already have implemented changes which will serve to decrease the probability of future RAE
  - Little League Baseball, as of 2006, changed their definition of the participation year to begin in May
  - American Legion Baseball, since 2003, uses the calendar year
  - Age restrictions for high schools vary by state
- Limitations
  - Single school
  - Limited geographic area
  - Rural setting
  - Could have influenced pool of available players
    - Coaching/Recruiting preference
  - Existing data
    - Subjects not available for follow-up questions
    - Unable to investigate history of the subjects
      - Birth location
      - Practice volumes, experiences, etc.
- Future Research
  - Influence of Academic Timing
    - Could be disguising RAE among American athletes
    - Limited amount of previous research focusing on college athletes
  - Effects of changes in definition of participation year
    - Recent changes in Little League Baseball and American Legion Baseball
    - Could study the effect within the organizations themselves or if the changes eventually influence the birth distributions at the college or professional levels

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