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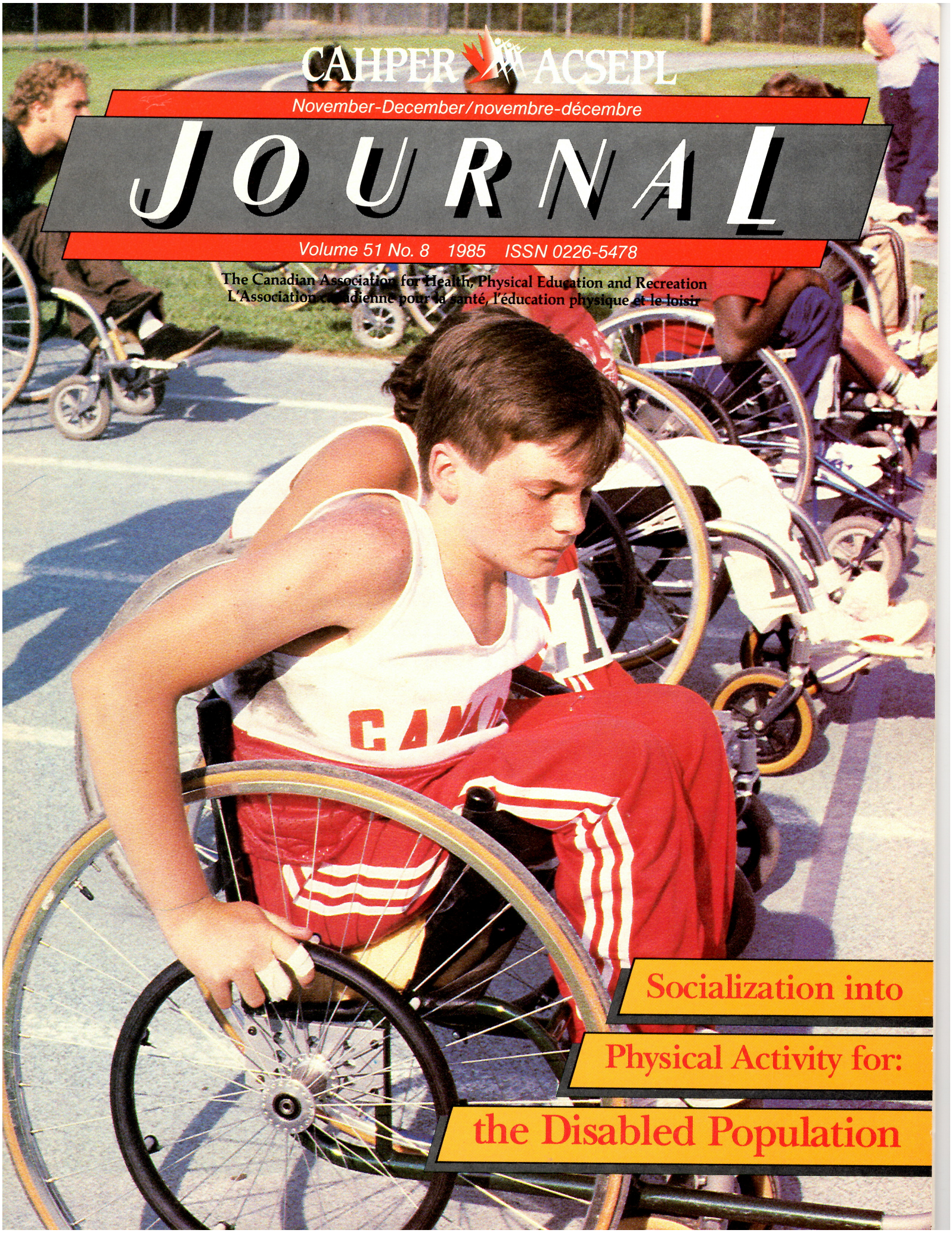
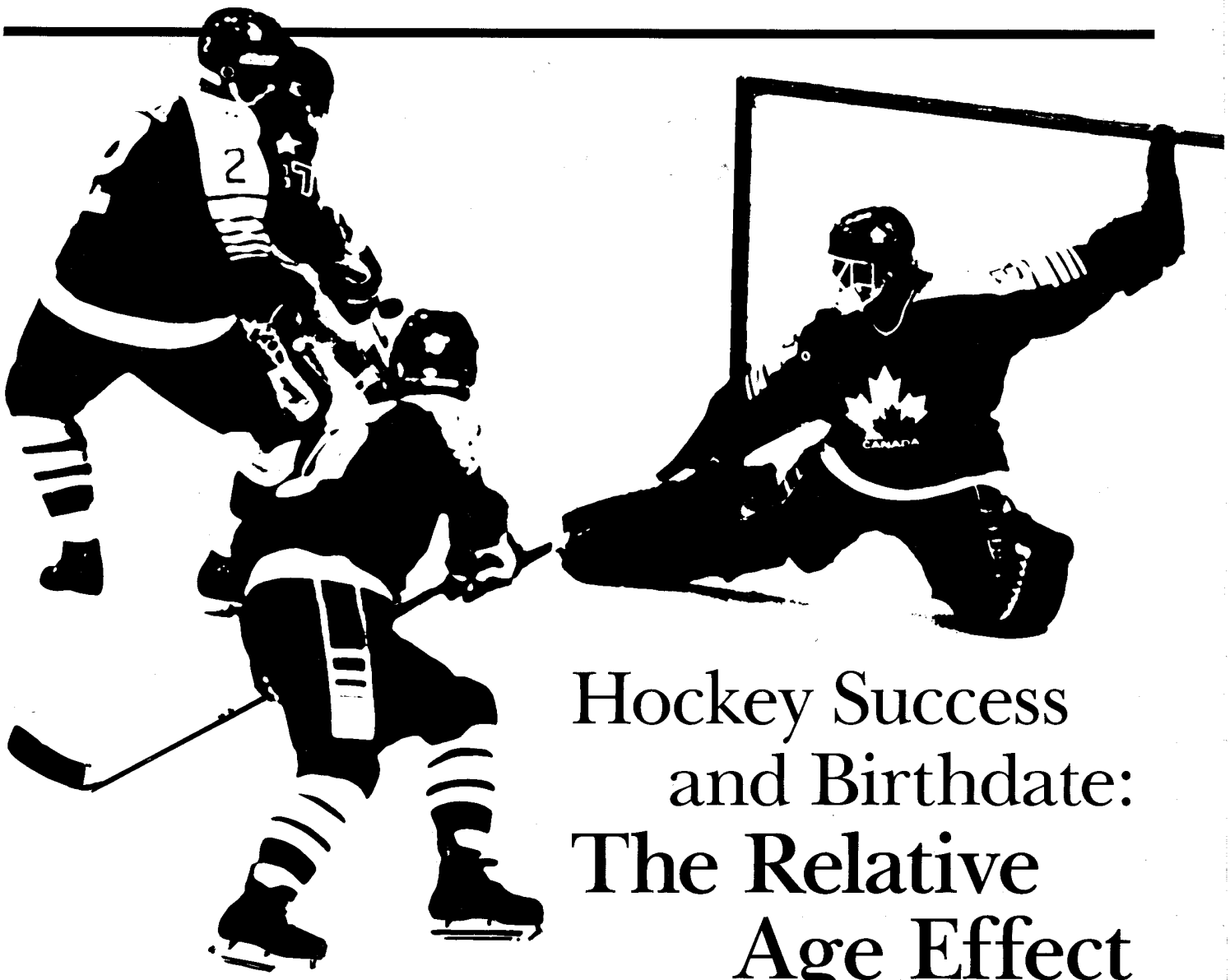


Socialization into Physical Activity for: the Disabled Population



Hockey Success and Birthdate: The Relative Age Effect

by R.H. Barnsley
A.H. Thompson
P.E. Barnsley

Résumé

Les joueurs de la Ligue nationale de hockey, de la Ligue de hockey de l'Ouest et de la Ligue de hockey de l'Ontario ont été classés selon leur mois de naissance. Les résultats ont révélé qu'il existe un lien direct entre le mois de l'année (de janvier à décembre) et le pourcentage de joueurs dans les ligues analysées. En d'autres termes, le nombre de joueurs sur la liste nés en janvier est le plus élevé et on observe ensuite une baisse régulière pour les autres mois de l'année. Ces observations sont un autre exemple de l'effet relatif de l'âge. Les résultats sont analysés en tenant compte du nombre de joueurs de hockey qui n'atteignent pas un niveau de performance reflétant avec exactitude leur potentiel.

Abstract

Hockey players from the National Hockey League (N.H.L.), the Western Hockey League (W.H.L.), and Ontario Hockey League (O.H.L.) were categorized according to their month of birth. The results revealed an extremely strong linear relationship between the month of birth (from January to December) and the proportion of players in the leagues studied. That is, the number of players on the rosters with January birthdates was the highest, followed by a steady decline throughout remainder of the year. These observations are interpreted as another example of the "relative age effect". The results are considered in light of the view that a number of potentially talented hockey players are not achieving the level of performance that would accurately reflect their ability.

Biographies

Roger Barnsley — Is a teacher and a psychologist. He completed his teacher training at the University of Victoria and subsequently completed a Ph.D. in Psychology at McGill University in 1970. After teaching at Memorial University of Newfoundland and the University of Lethbridge, he is now Director of Student Services at Lethbridge School District No. 51. Roger has coached minor hockey for the past four years.

TABLE 1

PERCENTAGE OF LIVE MALE BIRTHS BY MONTH IN CANADA

January	9.0%	July	8.7%
February	7.4%	August	8.7%
March	8.0%	September	8.7%
April	8.2%	October	8.3%
May	9.2%	November	7.9%
June	8.2%	December	7.7%

TABLE 2

MONTHS OF BIRTH
NATIONAL HOCKEY LEAGUE PLAYERS
1982/83 SEASON

PERCENTAGES				NUMBERS		
61.8%	32.0%	11.3%	January	81	229	442
		9.7%	February	69		
		11.0%	March	79		
	29.8%	10.1%	April	72	213	
		10.9%	May	78		
		8.8%	June	63		
38.2%	21.9%	6.4%	July	46	157	273
		6.3%	August	45		
		9.2%	September	66		
	16.2%	5.3%	October	38	116	
		6.3%	November	45		
		4.6%	December	33		

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TABLE 3

MONTHS OF BIRTH
WESTERN HOCKEY LEAGUE PLAYERS
1983 PROTECTED LIST

PERCENTAGES				NUMBERS		
71.5%	41.9%	15.5%	January	108	292	499
		14.5%	February	101		
		11.9%	March	83		
	29.6%	11.0%	April	77	207	
		10.9%	May	76		
		7.7%	June	54		
28.5%	19.3%	7.7%	July	54	135	199
		6.0%	August	42		
		5.6%	September	39		
	9.2%	3.6%	October	25	64	
		2.4%	November	17		
		3.2%	December	22		

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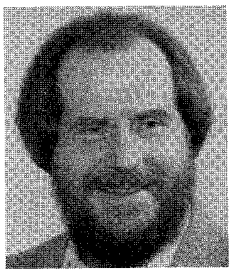


A.H. (Gus) Thompson — Attended the University of Alberta, University, of Calgary, and received his Ph.D. from the University of London in 1973. Dr. Thompson's present position is as a senior psychologist and Director of Research and Evaluation with Alberta Mental Health Services. Besides being a hockey fan, Gus is also an honorary professor of psychology at the University of Alberta.

Paula E. Barnsley — Is a teacher and a psychologist. She received her Masters Degree in Educational Psychology from Memorial University of Newfoundland in 1972. Paula, who is a "hockey mom" is currently involved in a private practice in psychology in Lethbridge, Alberta.

It is well known that, as they get older, most children grow larger and their skills and abilities in all areas of development improve. As a result, when activities are planned for young people, be they educational or recreational, age grouping generally takes place. For example, children entering Grade 1 usually have to become six years of age during the year of enrolment. That is, children starting school in September would have to have had their sixth birthday between January 1 and December 31 in the year of enrolment.

Similarly, in recreational activities children are frequently grouped by age. In hockey, for example, each child must turn eight years old between January 1 and December 31 in the year of enrolment in order to begin to play "MITE" hockey. There also is an upper cutoff date which defines the maximum age a child can be to play "MITE" hockey. This type of age grouping is found generally in all sporting activities, although the particular dates chosen for the cutoff times may vary from sport to sport.

It has been proposed (Barrow and McGee, 1971) that classification of participants in physical activities is used in order to equalize competition, facilitate instruction, provide for program contin-

uity, and promote safety for the participants. The purpose of this paper is to evaluate the extent to which age grouping as a classification system is successful in creating equality for hockey players.

The effect of age grouping on performance has been the subject of a great deal of research in the area of education. Of particular relevance to ths discussion is the notion of *relative age.* In this regard, it is pointed out that even though children are placed into grades by year, there still exists, for students within a particular grade, age differences of up to one year. For example, students entering the first grade in September may vary in age from 6 years, 8 months (January birthdate) to 5 years, 8 months (December birthdate). This difference in age among students in the same grade grouping has been called *relative age.*

Research on the relative age effect in education has produced a number of interesting observations. For example, Beattie (1970) and Davis, Trimble, and Vincent (1980) have found that the younger children entering Grade 1 achieve significantly less than their older classmates. It is also interesting to note that this Grade 1 entrance age effect continues to be found in older children. For example, Kalk, Lange, and Searle (1982) found that the effects of entrance age could still be observed in the educational achievement of thirteen-year-olds.

Other recent research has shown that the age of entry to school is related to the incidence within some classifications of exceptional children. Diamond (1983) and Maddux (1980) both found that children entering Grade 1 at an early age were more likely, as compared to their older classmates, to be classified as learning disabled later on in their school career. On the other hand, Maddux, Stacy, and Scott (1981) observed that, in a group of children who were classified as gifted, 39% were early entrants to Grade 1 as compared to 61% of the children who were late entrants. Although one cannot generalize from the preceding results to any individual child, the overall picture is clear: there is a risk of low achievement and learning problems with early age entrance children and, further, there is a positive relationship between higher academic achievement and being classified as gifted with late age entrance children.

With regard to hockey, the grouping of children by age also creates relative age differences between the participants. In order to determine whether relative age makes any difference to the success of hockey players the present research was conducted. In preparing for this study, it was determined that the relative age effect could be evaluated by examining the birthdates of successful hockey players. It was reasoned that if relative age did affect, or was correlated with, hockey performance, then there would be more successful hockey players born in the early months of the year (January, February, and March) because they would be the oldest in their age grouping, as compared to those born in the later months of the year (October, November, and December) as they would be the youngest in their age grouping.

FIGURE 1

QUARTERLY YEAR FREQUENCY
OF
1982/83 N.H.L. PLAYERS BIRTHDATES

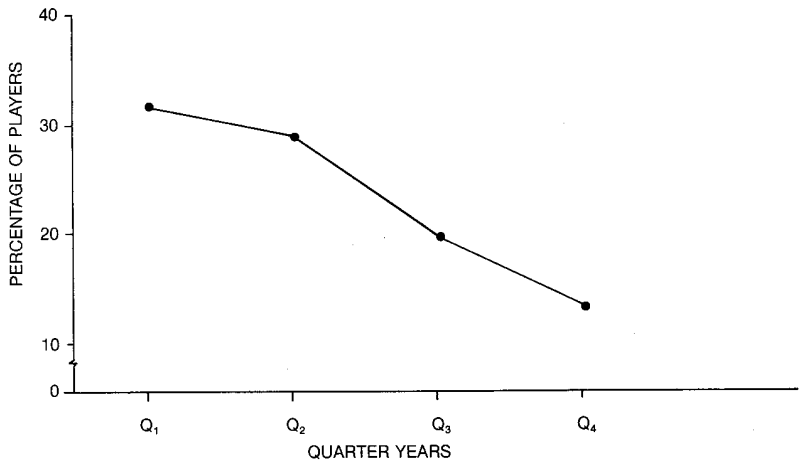


TABLE 4

MONTHS OF BIRTH
ONTARIO HOCKEY LEAGUE PLAYERS
1982/83 ROSTERS

PERCENTAGES				NUMBERS	
16.0%	January	56			
40.9% 12.6%	February	44	143		
12.3%	March	43			
71.7%					251
11.7%	April	41			
30.9% 10.9%	May	38	108		
8.3%	June	29			
					350
6.9%	July	24			
17.4% 5.7%	August	20	61		
28.3% 4.9%	September	17			
				99	
3.4%	October	12			
10.9% 2.9%	November	10	38		
4.6%	December	16			

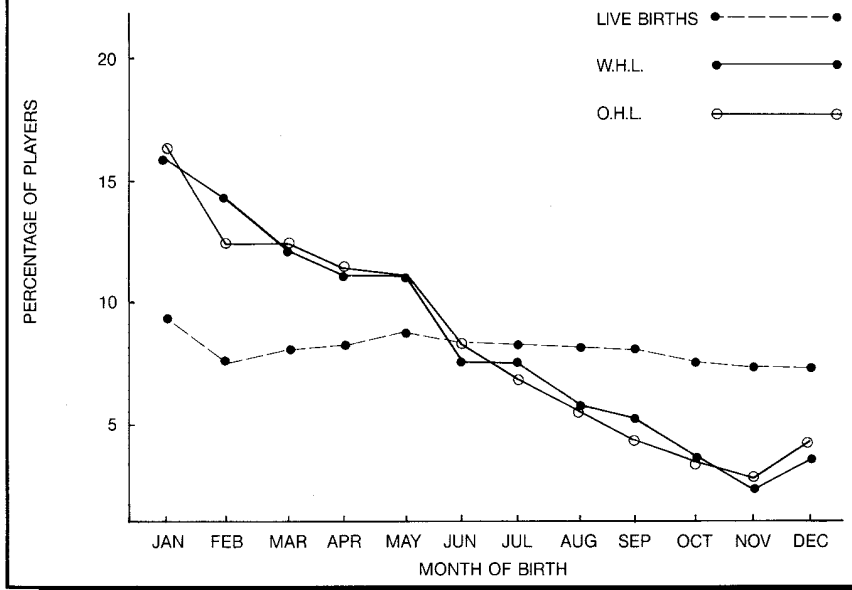
Method

Subjects

Birth records of the 1982/83 players from three major hockey leagues were selected for analysis. The players chosen were 1) those on the 50 player protected lists of each of the 14 teams in the Western Hockey League (W.H.L.) ,2) those on the team rosters of the 15 teams in the Ontario Hockey League (O.H.L.), and 3)

FIGURE 2

DISTRIBUTION OF BIRTHMONTHS
OF O.H.L. AND W.H.L. HOCKEY PLAYERS



those on the team rosters of the 21 professional teams comprising the National Hockey League. It should be noted that the W.H.L. and the O.H.L. are two of three major amateur (Junior A) developmental leagues for the N.H.L.

Team rosters, including birthdates, were supplied directly by the league in the case of the W.H.L., were taken from the 1983/84 "Official Guide" of the O.H.L. for that league, and in the case of the N.H.L., from the 1983 Yearbook, published by "The Hockey News."

Procedure

Simply, the birthdates for all players in each league were tabulated by month. The frequency distribution for each league was then compared to that which would be expected from the distribution of male live births in Canada over the course of a year. These latter data were obtained from the *Canadian Statistical Review* (1968), and reflected the number of live births, by month, from the period July 1, 1966 to June 30, 1967. These figures are shown in Table 1. These dates were chosen as they reflect the modal birthdates for players in the junior hockey leagues sampled. At any rate, there is very little variability in the distribution of live births from year to year.

Results

The first analysis was performed on the birthdates of players in the N.H.L. The figures are shown in Table 2. Data from Table 2 representing quarterly frequencies have been graphed and are presented in Figure 1. It can be seen from these data that for N.H.L. hockey players, more were born in the early months of the year with the monthly frequency gradually declining through December. In fact, N.H.L. players are almost twice as likely to be born in the first quarter of the year than in the last quarter. The observed distribution, by month, differed significantly from that which would have been expected based upon live births ($\chi^2 = 51.2$, df = 11, $p < .001$).

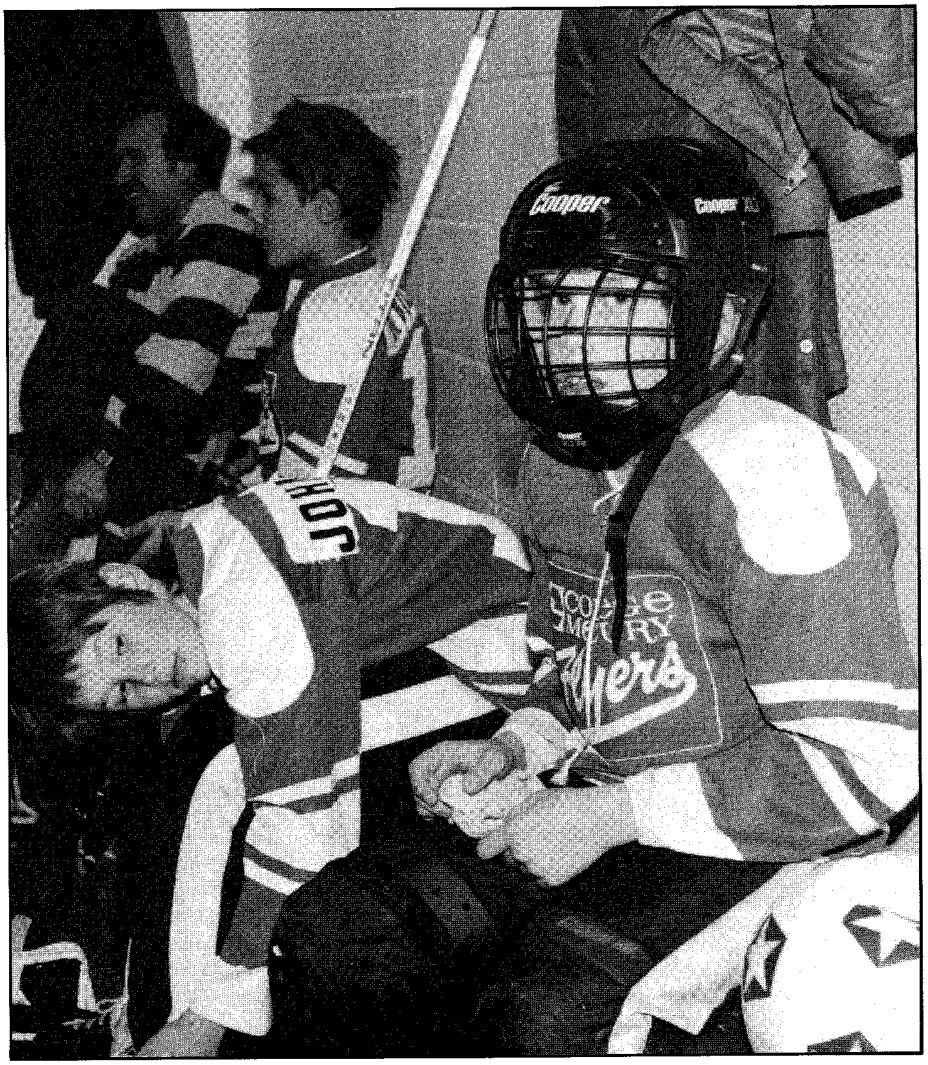
Similar results were found for both the W.H.L. and O.H.L. analyses. These data are shown in Tables 3 and 4 respectively. Data from these tables are presented in graphic form in Figure 2.

As with the N.H.L. data, it can be clearly seen that the birthdate effect is evident in

both junior leagues. In fact, the effect appears to be even more pronounced. For example, W.H.L. players are almost five times as likely to be born in January as they are in December, and they are over four times as likely to be born in the first quarter of the year than in the last quarter. Comparable figures for the O.H.L. were about 3.5 times and four times as likely, respectively. Differences between observed and expected values were statistically significant for both leagues. The χ^2 values were 180.0 (W.H.L.) and 82.9 (O.H.L.), both significant at the $p < .001$ level ($df = 11$).

In addition, Spearman Rank order correlations were calculated for the three sets of data by ranking the months from January through December. These calculations rendered significant relationships between the month and a rank order based upon the percentage of hockey players born in that month. For the N.H.L. data, the rank order correlation equalled .89 ($p < .01$), for the W.H.L. data, the correlation was .99 ($p < .01$), and for the O.H.L. data, the correlation was. 98 ($p < .01$).

The second hypothesis that is proposed to account for these data is that hockey success and the birthdate phenomenon is another example of the relative age effect previously discussed in relation to educational achievement.



Discussion

From these data, it is concluded that success as a hockey player is related to the month of birth. The important question that follows from these data is why should the month of birth be related to hockey success. It is suggested that there are two basic hypotheses that could account for these data. The first hypothesis suggests that the date of birth is related to fetal development through such factors as nutrition, or other environmental conditions. This hypothesis has been proposed by Diamond (1983) in order to account for the birthdate effect found with learning disabled children. It is argued, however, that the data in the present study refute this particular view. This conclusion is based on the reasoning that if there were a particular time of the year in which children were either prenatally "at risk" or "at advantage" it would then follow that the later measurement of performance (in this study — hockey success) should be normally distributed around the times of risk or advantage. However, in this study the month of highest success (January) is next to the month of lowest success (December). Such clear discontinuity between these juxtaposed months is strong evidence against the first hypothesis.

The second hypothesis that is proposed to account for these data is that hockey success and the birthdate phenomenon is another example of the relative age effect previously discussed in relation to educational achievement. This explanation is based on the fact that when children are age grouped, such as they are in minor hockey, the older children in the age group have a developmental advantage over the younger children in the same age grouping. As a result, when these children play hockey together, the older children (January, February, March birthdates), who are generally bigger, stronger, and better coordinated than the younger children, (October, November, December birthdates) do much better. By doing better, the older children in the age grouping achieve more success and receive greater rewards for their endeavours. Indeed, the adage that success breeds success reflects both a well known "folk fact" and psychological phenomenon. In addition, it is suggested that the "expectation phenomenon" as proposed by Rosenthall and Jacobson (1968) could result in the self-fulfilling prophecy for these older children in that they expect and are expected to be as relatively excellent as their early hockey experience dictates.

On the other hand, the complementary process is working against the younger players in their age grouping. Because these children experience a developmental disadvantage in relation to their older playing mates, they are more likely to experience frustration and failure, and as a result develop a lower expectation for themselves as hockey players. This analysis of the younger children's experience in minor hockey suggests that as a result of their negative experiences they

may tend to leave hockey for other recreational activities. If this were the case, and these data are currently being assembled, then the lower participation rate of hockey players born in the later months of the year could also be used to account for the birthdate effect found in the present data. Therefore, players born in the early months of the year would represent a larger pool of players than would be found in the later months.

As a corollary to the preceding analysis the observed relative age effect may also be enhanced by the fact that a number of contingencies are frequently correlated with the general process of "streaming" into ability groupings (e.g. "Rep" teams) within age classifications. For example, it is often observed that minor hockey associations tend to promote the better teams, and thereby the better players, through such advantages as better coaching, more ice time, higher competition, and more prestige. It follows, that to the extent that relative age creates difference in abilities between players in age classifications, then the older players are more likely to have their hockey talents better developed. Conversely , those youngsters relegated to lower level teams because of

Therefore, players born in the early months of the year would represent a larger pool of players than would be found in the later months.

their younger relative age may be severely disadvantaged in their development as hockey players even though they may possess a higher level of potential than those chosen for the better teams. This observation is somewhat ironic in that the grouping of players according to ability within an age classification would ordinarily be expected to neutralize the relative age effect.

Following from these data and conclusions, a number of questions arise that may be of interest to people who are responsible for minor hockey and the development of olympic and professional hockey players. First, it could be argued on the basis of the birthdate phenomenon that many hockey players with the potential to play in the N.H.L. are being lost because of the relative age effect. If this is the case, then perhaps cutoff dates for age groupings could be changed from year to year in order to alter the relative ages of each player and thereby produce successful hockey experiences for all players over a span of three or four years. Also, it may be wise for these hockey decision makers to look at factors such as size and skating ability, rather than age when grouping players and then ensure that the contingencies (e.g. coaching, ice time, etc.) are equivalent for all teams and players regardless of apparent level of ability. It is proposed that such procedures would increase the probability that hockey success was more directly related to skill and motivation rather than relative age. Further, it is suggested that performance and size grouping may be of particular importance at the age when body checking is introduced into the game.

Another case where future research would be most instructive would be in finding a sport where the birthdate phenomenon was not observed in top calibre adult players.

The preceding notions are suggested only in a speculative manner at this time. The reason for this caution is that it could also be argued that the true incidence of natural hockey potential is represented by the frequency of players born in the later months of October, November, and December. It would then follow that the increase in frequency observed in the players born in the early months of the year represents the cumulative effect of the relative age phenomenon and the advantages accruing to them. Thus, to alter entry dates for age groupings each year in order to spread the success among all players, might serve only to detract from the cumulative advantage gained by the older players, and thereby introduce mediocrity for all, thus reducing the total of players of high calibre. It is expected that this dilemma will be resolved when the study of participation rates in minor hockey is completed.

Another case where future research would be most instructive would be in finding a sport where the birthdate phenomenon was not observed in top calibre adult players. If such a sport could be found, it would logically follow that the developmental program for young players in that sport had been organized in such a way as to neutralize the relative age effect. Clearly, such information would offer exceedingly valuable advice for the organization of minor hockey leagues.

To conclude, the present study documents the birthdate phenomenon in relation to hockey success. On the surface, it appears most surprising that something as simple as the month in which a person is born should have a large relationship with highly skilled performance twenty years later in life. However, as was discussed, a number of very complex processes may well be involved in this phenomenon. It is anticipated that future research will lead to a better understanding of the mechanisms involved in the birthdate phenomenon and a knowledge of its generality in regard to other areas of human endeavour.

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Footnotes

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