RELATIONSHIP OF BIRTH ORDER, SIBLING SPACING, AND FAMILY SIZE TO DRINKING PROBLEMS AND ORAL BEHAVIOR

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ABSTRACT

RELATIONSHIP OF BIRTH ORDER, SIBLING SPACING, AND FAMILY SIZE TO DRINKING PROBLEMS AND ORAL BEHAVIOR

By

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The present study was designed to examine the relationships of birth order, spacing between siblings, and family size with problem drinking and oral behavior. It was hypothesized that later birth positions, close spacing and increased family size would be related to greater problem drinking and oral behavior because of more oral and attentional frustration on the part of the parents.

Quantity-frequency scores of alcoholic intake, scores from the Park Problem Drinking Scale, and cigarette smoking information was obtained by questionnaire from the subjects, 104 boys, aged 16 to 18, as well as birth order, sibling space, and family size. Statistical analysis demonstrated that there are no main effect differences between birth positions for any measure of orality. Similarly, family size showed no relation to oral behavior. The spacing between a subject and his next younger sibling

(post-gap) discriminated significantly for first-borns on quantity-frequency scores, the Park Scale, and cigarette smoking, small gaps showing more of these behaviors than large gaps. These results were attributed to the greater anxiety of parents when children are born too closely after a first-born causing frustration of both oral and attentional needs. Attention was also directed to the importance of gap as a partial determinant of birth position effects in earlier studies, which may account for some of the discrepancies in the earlier literature.

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Holly Van Horn

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CHAPTER I

INTRODUCTION

Introduction

While the specific variables contributing to the genesis of drinking behavior are legion, it is necessary for a scientific investigation that each variable be separated and scrutinized individually to arrive at an understanding of both its unique influence and the nature of its interaction with other contributory variables. Once the variables are separated it becomes of further necessity to discover if these variables are important in and of themselves or if they are not rather the surface manifestations of deeper and perhaps more complex determinants. This particular study takes adolescent drinking problems as the focus of the investigation and birth order, family size, and length of spacing between siblings as the antecedent variables to be separated. Another aspect of the investigation is to discover the extent to which these variables have some consequence. Is it because they similarly affect the entire spectrum of oral behaviors, the drinking of alcohol being one of these,

or are the effects alcohol specific? To provide some orientation for this study and to give support for both the theoretical outlines and the experimental design itself, a review of the literature will follow.

Literature Review--Sibship Structure and Drinking Behavior

Stanley Schachter's (1959) imaginative work on the relationship between affiliative behavior and birth order instigated researchers in many areas of psychology to utilize the birth order variable when studying the behavior and personality correlates of an experimental subject. Researchers in the field of alcoholism, having already used this variable to a certain extent, elaborated their work and emphasized it more than it had been in the past. Bakan (1949), a precursor of Schachter in birth order research, used a chi-square method of analysis and found that the population of higher birth rank contributed more than its expected share to the alcoholic population. As he said, "Youngest children are more likely to appear in our alcoholic population than individuals of other birth ranks." Schachter (1959) interpreted these findings as being supportive of his conclusions that under conditions of anxiety, later-born individuals seek to affiliate significantly less than first-borns. Alcoholism is generally considered an asocial mode of behavior (Robins, 1966; Zucker and Fillmore, 1968; Kalin and Williams, in press), and the alcoholic individual is often found to do much of

his drinking alone rather than in the company of others. In other words, when faced with anxiety, a later-born would be more inclined to choose an unaffiliative coping mechanism, e.g., drinking, while a first-born would choose a more affiliative method, e.g., psychotherapy (Schachter, 1959).

Smart (1963) criticized Bakan for choosing subjects from a population convicted of crimes involving alcohol. Perhaps the critical variable in this study was the criminal nature of the subjects rather than the incidence of drinking problems. In addition, he criticized Schachter for assuming second and third-borns as early-born without taking the family size into account. In a family of three, second and third-borns are later-born. In a study of his own using alcoholics from alcoholism clinics he corrected for family size using the Greenwood-Yule method (a method which transforms the size of a sibship in relation to its frequency in the normal population as determined by census values) and found no significant differences between the expected and the observed occurrence of alcoholism in any birth rank. He did, however, conclude that it is family size that is important and that the larger the family the greater the incidence of alcoholism; that is, those with one to four children were shown to have significantly fewer drinking problems than those with five or more children.

Smith (1965) criticized the use of census values as the norm for transformation because the census only

considers the family living together at the time. It does not take into account that young people will have more children living at home while older people have more children who have already married and left home. In comparing the alcoholics from Smart's study to medical patients in a general hospital, there were no significant differences in representation as a function of the size of sibship. But here again the question can be raised concerning the appropriateness of the control group. Is a sample of patients from a general hospital comparable to a sample from the general population? From this study, can it be assumed that, because there is no difference between the alcoholic sample and the medical patient sample, there is also no difference between alcoholics and the general population on this dimension?

De Lint (1964), using female alcoholics from a research clinic, demonstrated that overrepresentation of last-borns in his sample was attributable to an overrepresentation of persons not reared by both parents. That is, later-borns are more likely to have lost one or both natural parents during the first five years than early-borns. Perhaps it is this absence that influences later-borns toward alcoholism, rather than affiliative tendencies. De Lint's findings are supported by Wahl (1956), who used male alcoholics from a state hospital. Sibling position was not related to alcoholism but parental loss was.

Other studies finding significantly more later-borns in the population of alcoholics were done by Martenson-Larsen (1957) and Navratil (1956). The latter felt that these results occurred because of the constitutional defects (especially digestive weakness) which more frequently characterize the later-born individual. However, these findings must be evaluated with the awareness that Martenson-Larsen did not even consider the case of middle-borns, while Navratil only studied the last-borns, comparing them to the expected frequency of last-borns in the general population. Chen and Cobb (1960), on the other hand, found that alcoholics with police records or hospitalization were more likely first-born. Supportive of this is the work of Moore and Ramseur (1960) which revealed more first-borns than later-borns when the alcoholics are volunteer patients rather than those who have been coerced into the hospital.

The confusion of the above results emphasizes the importance of methodology as a determinant of the specific conclusions that will be drawn. Subject-pools have enough diversity to preclude comparison between studies; control groups are haphazard, and the overall designs are predominantly loose. Even considering that the structure of the designs were tightened up and it could be more universally accepted that later-borns were more likely to become alcoholics, what has this really meant? The problem still remains as to why later-borns will be more likely to become alcoholics. Perhaps with this information more productive

preventive measures can be instituted. And finally, many of the above disparate results may be caused by the confounding of the birth position by such things as family size and, as will be seen later, the size of the gap between children. All of these factors must be taken into consideration and corrected before an effective investigation of the problem can be undertaken.

Suggestions concerning the dynamics behind the occurrence of drinking problems in later-born individuals other than the previously mentioned suggestions of decreased affiliative needs (Schachter, 1959), increased family size of the later-born (Smart, 1963), parental deprivation (De Lint, 1964), and a greater extent of constitutional defects (Navratil, 1956), have been offered. Weller (1965) feels that it might be related to his finding that later-born infants have higher levels of arousal than first-borns, greater conditioned anxiety, and consequently greater affinity for any method of anxiety reduction.

Through his study of parental attitudes toward child-rearing, Henry (1957) discovered that more first-borns are father disciplined and dominated while later-borns tend to be disciplined more often by the mother. Because the mother is so strongly related to need gratification, it is more difficult for the child to express hostility to her than it is for the first-born to express hostility toward the father. This results in more guilt over aggressive tendencies, more turning inward, and consequently

less affiliative behavior on the part of the later-born. Warren (1966) has offered several suggestions for the birth order differences. He maintains that perhaps they are produced by changes in the intrauterine environment after each birth through length of labor or use of forceps. The age of the mother would then be crucial both before and after birth; later-born children naturally having older mothers. Finally, Dittes (1961) and Staples and Walters (1961) have separately found that first-borns are more conforming, leading to the conclusion that the more conforming an individual the less likely he will participate in anti-social activities (e.g., alcoholism).

Sampson (1965) criticized the alcoholic and other birth order studies for overemphasizing the selection of the sample at the expense of the data (field designs using correlational methods) resulting in poor control, and yet warns against the mistake of overemphasizing the utility of laboratory methods which limit the number of subjects and offer little in the way of validity or generalization to the real environment. In addition, he maintains that the aforementioned studies are putting too much emphasis on birth order per se. It is too easy for other variables to enter in and confound the data. He recommends considering such variables as the sex of the sibling, the sex of the subject, age spacing, family size, and cultural and socioeconomic factors. In other words "order of birth,

in and of itself, is not useful in understanding or explaining the development of personality and behavior" (Sampson, 1965).

In birth order research which is not concerned with alcoholism there have been steps taken in this direction. Koch (1955), especially, has been concerned with personality differences related to these other factors--sex, spacing, rank, and culture, and has found many complex interrelationships between them resulting in significant differences on many personality dimensions. Lasko (1954) also researched this area and concluded that spacing was a more important influencing factor than sex ratio. And finally, Miller and Zimbardo (1966), using the size of the space between siblings as a variable, concluded that large gap last-borns fell between first-borns and narrow gap last-borns in affiliative trends, and that the larger the gap, the more the child resembled a first-born or only child.

It appears therefore that it is important to consider the size of the gap between siblings, as birth order alone is not the simple variable it may seem to be on the surface. Miller and Zimbardo have found that the last-born birth position is not a homogeneous factor but that wide-gap and narrow-gap individuals respond differently, at least as far as affiliative behavior is concerned. If this is true for last-borns, it certainly is a possibility for the other birth positions as well. Similarly, if the gap effect exerts influence on the manisfestation of affiliation it

might also be an integral component in the configuration of later drinking behavior. At the present, no research has been carried out concerning the relationship between gap and drinking problems, a fact which this study will eliminate. In addition to studying the effect of gap, it is necessary to consider the interaction of gap and birth position as the gap may not have a similar effect on all positions but in some may increase the behavior and in others decrease it. If the interaction is not investigated, the same criticism can be directed to gap research as to birth order research, i.e., that it treats the phenomenon as much more simplified than it actually is.

These attempts to analyze exactly which aspect of the family constellation is important in forming personality should be extended to research with problem drinking populations. The spacing between siblings seems to be an especially important influence affecting personaltiy and should be investigated along with birth rank when evaluating the etiology of drinking problems. It would be valueless, however, to look only at the relationships between birth rank, spacing, and alcoholism without postulating why these variables would have the effect they do; that is, it is important to discover what intervenes between the two observable factors.

Literature Review--Determinants of Personality Differences in Sibship Structure

One set of intervening variables that should provide a very strong influence on this interaction are those relating to child-rearing practices. Sears, Macoby, and Levin (1957) have found that parents differentially treat children of the various birth positions and that these treatments are generally consistent across families. For example, they have found that delight at the prospect of the child decreases directly with the number of children; permissiveness also decreases, and frustration of dependency needs increases. Schachter (1959) suggests that the mother feels more confident than with the first-born. In addition, she does not have as much time to spend with him and thus does not respond to his needs as quickly or stay as long. Koch (1955), Bossard and Boll (1956) and Rosen (1961) all found that parents spoil, show preference, and talk more with the first-born than the later-born child. In Bossard and Boll's (1956) work they discussed eight different character "types" and their most probable sib position. One type was labelled the social isolate and was described as secretive, antisocial, stubborn, withdrawn, "at war with the world," and irresponsible. This type was most often a later-born child. Coincident with this are Storer's (1961) results demonstrating that the later-born child is more anti-social, has a less severe superego, less impulse control, and less ability to delay gratification

leading to generally more aggressive behavior. This finding is supported by other studies (e.g., P.Sears, 1951; Dean, 1947; Gewirtz, 1948; Patterson and Zeigler, 1941; Wile and Davis, 1941; Koch, 1955; and Haeberle, 1958). However, Stratton (1934) and Wile and Noetzel (1931) found no significant differences on the dimension of aggressive behavior.

When looking at child-rearing practices as possible reasons for differences of drinking patterns between birth positions, one seems predominant and that is the approach to feeding that the mother takes for each child. Sears et al., (1957) found that, first of all, fewer youngest children were breast-fed and that, no matter what method of feeding was used--breast or bottle--middle and younger children were weaned earlier and more severely. There are several explanations for this phenomenon. One is that the mother is busier and has less time to spend with the later-born child. Bottle-feeding saves time as the father or one of the other children can feed the child while a mother's presence would naturally be required if she were breast-feeding. In addition, often the mother's desire for modesty prevents her from breast-feeding a later-born child when there are other children present. As weaning time approaches, the mother may wish to complete the procedure as quickly as possible so that she will not have to spend as much time feeding. She will therefore accelerate the weaning process and be more demanding than with her early-born children.

Although the experimental findings were focused on birth rank data, Sears et al., also recognized the importance of the age gap as an influencing factor. It is unfortunate that they did not include this factor when considering the differential child-rearing practices of parents. It would be interesting to discover whether the narrowness of the gap influences the breast-feeding or weaning methods of the mother. Following the reasoning of Sears that birth order is important because of the decreased amount of time the mother can afford to spend with the child, it would also seem tenable that the narrower the gap the more likely the mother would bottle-feed and wean more strictly. The experimenters did, however, discover that the mothers are warmer and have a more favorable attitude toward the child when there is a large gap rather than a narrow gap.

There has been some evidence to show that the result of this early weaning may be frustration of oral needs, needs which will be satisfied by other methods if the bottle or breast are denied. The work of Levy (1928) is an example of this type of research when he revealed that human infants who are deprived of adequate oral stimulation by bottle or breast resort significantly more often to displaced sucking, fingers or other objects, than infants not so deprived. Freud (1905) went even further in emphasizing the importance of oral needs and stated that the deprivation would determine the entire direction of a

child's personality development, those frustrated utilizing such behaviors as kissing, smoking, eating, and drinking throughout their lives to make up for this lack.

In extending this frustration of oral needs to the seeking of gratification through drinking, Zucker (1968a) suggested that concern with primitive gratification may have its roots in early frustration experiences--of either a specifically oral or of a more general dependency deprivation type--but that in either case, the problem drinkers in later life appear to be pursuing modes of satisfaction through excitement and sensation seeking (i.e., anti-social behavior). Alcoholic drinking easily fits into this pattern as one manifestation of the same kind, that in addition provides oral gratification. In this context, Zucker and Fillmore (1968) found that problem drinking adolescents had greater amounts of TAT fantasy concerned with immediate bodily experience--specifically, more physical aggression and more oral ingestion fantasies.

In the same manner, Rorschach cards elicited more oral responses by alcoholics than controls in a study by Bertrand and Masling (1969) as well as in a study by Wiener (1956). Related to this is the work of Masling, Weiss, and Rothschild (1968) who showed that later-born individuals responded with more oral images to Rorschach cards than first and only-borns, perhaps suggesting an explanation for the finding that later-borns are more highly represented in alcoholic populations.

Other investigators also offer evidence that orality and drinking problems are concomitant behaviors. Matarazzo and Saslow (1960) demonstrated that individuals with a higher alcoholic intake likewise drink more coffee and smoke more cigarettes than those individuals with a lower alcoholic intake. Similar findings have been presented by McArthur, Waldron, and Dickinson (1958) and Heath (1958).

Statement of the Problem

The purpose of this study is to discover what the relationships are between birth position, size of age gap between children, drinking behavior, and concern with oral gratification in a sample of late adolescents. It is an attempt to demonstrate that if in fact later-born and narrow-gap individuals are more likely to become problem drinkers, they will also exhibit a greater amount of oral behavior in areas other than problem drinking.

If confirmed, this might add support to the theory that oral deprivation at the infant level is a contributing cause to later problem drinking. An alternative explanation is that the narrow age gap is not only important because of its effects on the feeding practices, but also because it increases the environmental stress by decreasing the amount of attention the child is able to receive from the parents. If this is true, then it would be expected that a narrow pre-gap (between the subject and older siblings) rather than only a narrow post-gap (i.e., between the subject and a sibling who arrives before weaning is completed)

would have this effect of increasing drinking problems. Likewise, a large number of siblings in the family would decrease the amount of attention the child is able to receive and should also serve to result in a similar pattern of drinking behavior. In other words, if a gap effect were found in the data this would not entirely prove that it is oral frustration which is causing the result, as the instigation may come from other stress factors. But if the post-gap effect is shown to be more influential than the pre-gap effect this would place more evidence in the direction of a feeding practices causation than if both types of gap are equally effective. Optimally, it would be necessary to actually go back and observe whether those individuals with later drinking problems have actually been orally frustrated.

Finally, the use of late adolescents as subjects rather than alcoholics is important for two reasons. First of all, the majority of studies employing alcoholics utilize subjects who are by no means representative. Subjects are taken from clinics, prisons, or social agencies, leaving the population of less-visible alcoholics, those not in trouble with the law or seeking help, ignored. It is unknown whether extrapolation to more representative populations would produce similar findings. In addition, by studying the motivations for adolescent drinking, it may be possible to learn which variables are contributing

to subsequent problems before they emerge in the form of confirmed alcoholism, thereby providing information for possible prevention (cf. Zucker, 1968b; Zucker and Fillmore, 1968).

Hypotheses

1a. Post-spacing--First and middle-born adolescents with a small age-space (0-24 months) between self and next younger sibling will exhibit greater drinking problems than first and middle-born adolescents with a large age-space (more than 24 months) between self and next younger sibling. Because last-borns have an infinitely large post-space they are a special case and should be compared to the other groups in a subsequent analysis.

1b. Post-spacing--First and middle-born adolescents with a small age-space (0-24 months) between self and next younger sibling will exhibit greater orality other than drinking problems, when compared to first and middle-born adolescents with a large age-space (more than 24 months) between self and next younger sibling. Because last-borns have an infinitely large post-space they are a special case and should be compared to the other groups in a subsequent analysis.

2a. Pre-spacing--Middle and last-born adolescents with a small age-space (0-24 months) between self and next older sibling will exhibit greater drinking problems than middle and last-born adolescents with a large age-space

(more than 24 months) between self and next older sibling. Because first-borns have an infinitely large pre-space they are a special case and should be compared to the other groups in a subsequent analysis.

2b. Pre-spacing--Middle and last-born adolescents with a small age-space (0-24 months) between self and next older sibling will exhibit greater oral behavior other than drinking problems, when compared to middle and last-born adolescents with a large age-space (more than 24 months) between self and next older sibling. Because first-borns have an infinitely large pre-space they are a special case and should be compared to the other groups in a subsequent analysis.

3a. Total space--Middle-born adolescents with a small (less than 24 months) pre and post space (that is, between the next older sibling and the next younger sibling, a total space of 48 months or less) will exhibit greater drinking problems than middle-born adolescents with a large pre and post-space (greater than 24 months in each direction, or a total or more than 48 months).

3b. Total space--Middle-born adolescents with a small (less than 24 months) pre and post space (that is, between the next older sibling and the next younger sibling, a total space of 48 months or less) will exhibit greater oral behavior other than drinking problems than middle-born adolescents with a large pre and post space (greater than 24 months in each direction, or a total of more than 48 months).

4a. Family size--As the family size of later-born adolescents increases, the extent of drinking problems in adolescents will increase proportionately.

4b. Family size--As the family size of later-born adolescents increases, the extent of oral behavior other than alcoholic drinking will increase proportionately.

CHAPTER II

METHOD

Subjects were 104 boys, juniors and seniors in high school, aged 16-18, members of the cross-validation sample of Zucker's (1968a, 1968b) continuing research on the development of problem drinking among adolescents. These subjects were chosen at random from class lists of the one public high school in a community slightly under 15,000 people in one of the Middle Atlantic States. The community is characterized by a fairly wide distribution of income and educational levels and religious and nationality groups.

Procedure: Subjects (each paid five dollars for participation) were contacted at home and asked to attend a two hour questionnaire session in a church educational building in their community. The study was introduced as one concerned with teenagers' leisure time activities. Information was gathered concerning these activities, and included questions about the consumption of alcoholic beverages. Questions were also included to determine

birth order, age spacing of siblings, family size, and nonalcoholic oral behaviors.

The alcohol consumption questions, derived from Cahalan and Cisin (1967), allowed for the computation of a quantity-frequency measure of self-reported alcoholic intake (in standard drinks per year). This measure is the product of number of drinking occasions per year and average number of standard drinks consumed per occasion. See Appendix I for the questions from which this information was obtained and the quantitative value assigned to each.

As another measure of problem oral behavior, the Park (1962) Problem Drinking Scale items were also obtained. These items were designed to measure such things as antisocial behavior associated with drinking, the impairment of social relations because of drinking, drinking to excess, the occurrence of blackouts, benders, etc. The instrument, together with scoring directions for the items, can be found in Appendix II.

Nonalcoholic oral intake was assessed via a measure of smoking amount (cigarettes, pipes, cigars) per week (see Appendix III).

CHAPTER III

RESULTS

In the main, hypotheses were analyzed by 2 X 2 analyses of variance for unequal cell frequencies (unweighted means analysis). The homogeneity of variance assumption was tested with Hartley's test. In all of the following analyses, the five only children in the sample were omitted because of their special characteristics (i.e., they share characteristics of both first and last-borns).

For Hypothesis 1a it was predicted that first and middle-born adolescents with a small age-space (0-24 months) between self and next younger sibling will exhibit greater drinking problems than first and middle-born adolescents with a large age-space (more than 24 months) between self and next younger sibling. Means and standard deviations for quantity-frequency scores for alcoholic intake for Hypothesis 1a are given in Table 1. Hartley's test for homogeneity of variance was performed on the data, and showed significantly different variances ($F_{max} = 9.73$, $p < .01$). For this reason, and because the data fit the

TABLE 1.--Alcoholic intake means and standard deviations on large and small post-gap first and middle-borns--raw and transformed data.

Classification	N	Raw		Transformed[a]	
		Mean	S.D.	Mean	S.D.
First-born					
large post-gap	23	120.75	281.76	13.95	16.41
small post-gap	14	323.50	491.44	26.18	24.71
Middle-born					
large post-gap	16	194.31	432.15	18.99	20.46
small post-gap	9	96.06	157.52	14.41	13.35

[a]Freeman-Tukey square-root transformation.

characteristics of a Poisson distribution (one in which variances increase as means increase and a distribution which most often occurs when recording number of events per unit time as in this case) it was decided to perform a Freeman-Tukey Square-Root Transformation (i.e., $x' = \sqrt{x} + \sqrt{x + 1}$; see Mosteller and Bush, 1954). The transformed means and standard deviations are also given in Table 1. The results of the analysis of variance on the transformed data are shown in Table 2. This shows a significant interaction ($p < .05$). Figure 1 illustrates this relationship; it shows that the greatest contribution to the interaction is from small gap first-borns.

To discover which differences between individual cell means were significant, a t-test for unweighted means analysis was applied. Table 3 shows the difference between all pairs of transformed means and indicates which differences are significant. The means used to compute differences represent transformed data. As can be seen from these data and from Figure 1 the only significant difference is between the large and small post-gap for first-borns. In other words, the post-gap variable appears to have no effect for the middle-borns and there is no difference between middle-borns and first-borns as a whole.

The next step was to discover the manner in which last-borns compare with the other groups. Last-borns are a special case as they cannot be divided into large and small post-gap and therefore do not meet the requirements

TABLE 2.--Analysis of variance on transformed alcoholic intake scores birth order and post-gap analysis.

Source	SS	df	MS	F
Total	25004.50	62		
Post-gap	209.06	1	209.06	0.53
Birth order	161.79	1	161.79	0.41
Interaction	1592.97	1	1592.97	4.01*
Error	23040.68	58	397.25	

*$p < .05$, two-tailed test.

TABLE 3.--Differences between alcoholic intake means hypothesis 1a--transformed data.

	Firsts large-gap	Middles small-gap	Middles large-gap	Firsts small-gap
Firsts large-gap	---	0.46	5.04	12.23*
Middles small-gap		---	4.58	11.77
Middles large gap			---	7.19

*$t = 1.85$, $p < .05$, one-tailed test.

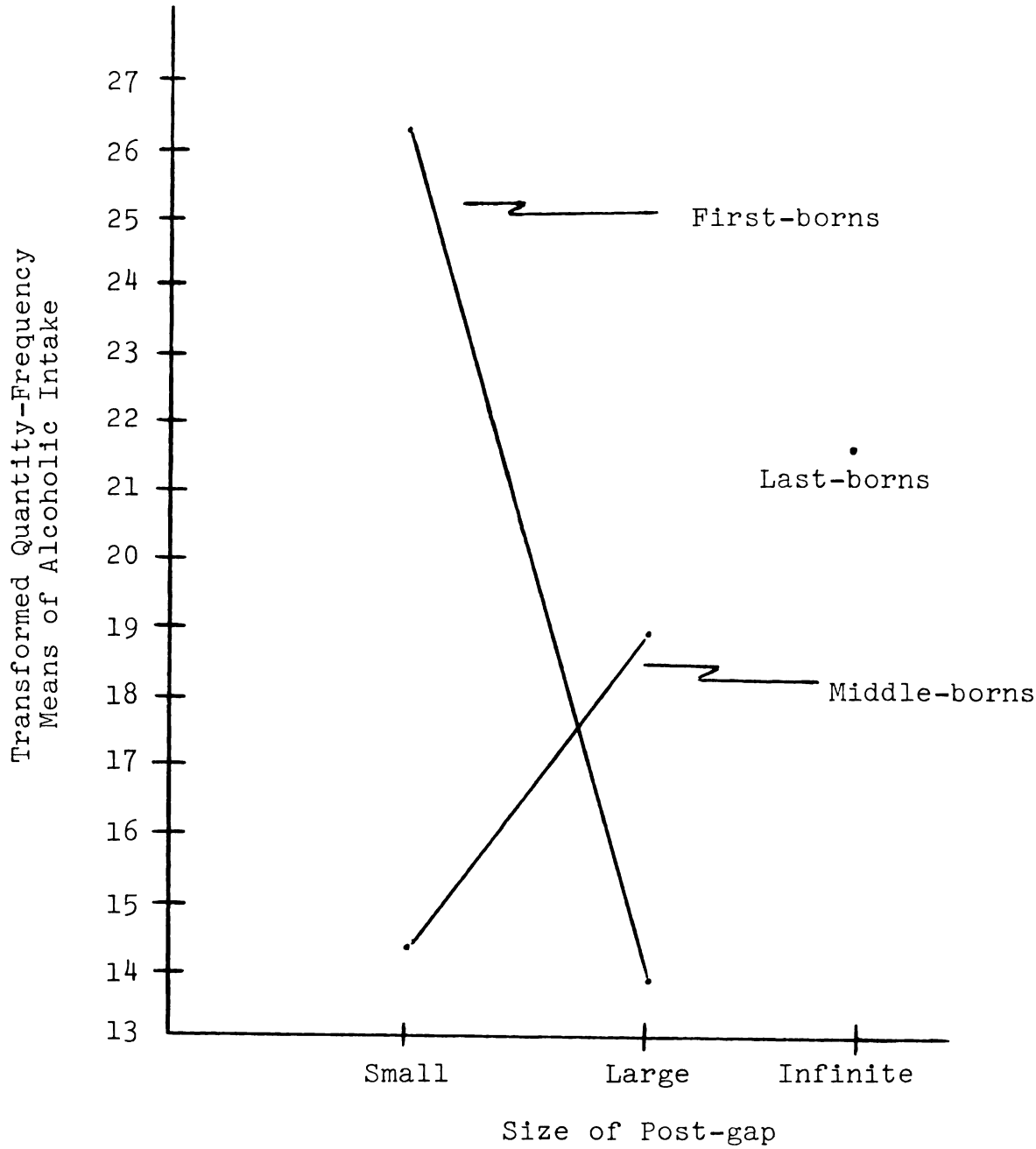

Figure 1.--Alcoholic intake of first and middle-born subjects as related to size of post-gap.

for a 2 X 3 design. This birth position can be considered either from the perspective of birth order or from the perspective of gap; i.e., last-borns have an infinitely large post-gap. The significant interaction on the main analysis indicates that last-borns should be considered from both perspectives.

Means and standard deviations for both the gap size and birth order groups are given in Table 4. The results of Hartley's test were significant for both (F_{max} = 5.02, $p < .01$ for the birth order comparison and F_{max} = 4.93, $p < .01$ for the gap size comparison). After the Freeman-Tukey Square Root Transformation was applied, a one-way analysis of variance was performed and the results are given in Table 5. As can be seen, there are no differences between any of the birth positions or between any of the post-gap groups. Therefore no evidence is offered that last-borns differ from any other group on alcoholic intake.

A second set of analyses for Hypothesis 1a were carried out using an alternate measure of drinking problems--i.e., the Park Problem Drinking Scale. For the data from this scale, means and standard deviations are given in Table 6. Cell frequencies are identical with those in Table 1. Hartley's test was performed on the data and resulted in F_{max} = 2.60 (n.s.,) which obviates the need for any data transformation. Table 7 gives the analysis of variance results and shows that the post-gap variable is the only trend effect ($p < .10$); both the birth order

TABLE 4.--Alcoholic intake means and standard deviations of later-borns and other birth order and gap size groups--raw and transformed data.

	Raw		Transformed[a]	
	Mean	S.D.	Mean	S.D.
Birth Order Categorization				
first-born	199.60	390.14	18.58	20.82
middle-born	158.94	361.50	16.97	16.81
last-born	322.87	809.65	21.62	28.74
Gap Size Categorization				
small post-gap	234.76	411.02	21.61	21.76
large post-gap	151.72	354.84	16.41	18.43
last-born (infinite)	322.87	809.65	21.62	28.74

[a]Freeman-Tukey square root transformation.

TABLE 5.--Analyses of variance comparing birth positions and post-gap size groups on alcoholic intake (transformed data).

Source	SS	df	MS	F
		Birth Position		
Total	62590.27	103		
Between	599.50	2	299.75	0.49
Within	61990.77	101	613.77	
		Gap Size		
Total	757.04	103		
Between	27.64	2	13.82	1.91
Within	729.40	101	7.22	

TABLE 6.--Park problem drinking score means and standard deviations on large and small post-gap first and middle-borns.

Classification	Mean	Standard Deviation
First-born		
large post-gap	2.35	2.28
small post-gap	4.57	3.04
Middle-born		
large post-gap	3.19	2.24
small post-gap	3.00	1.88

TABLE 7.--Analysis of variance on Park problem drinking scores birth order and post-gap analysis.

Source	SS	df	MS	F
Total	384.61	61		
Post-gap	17.56	1	17.56	2.82*
Birth-order	4.71	1	4.71	0.76
Interaction	1.25	1	1.25	0.20
Error	361.09	58	6.22	

*$p < .10$, two-tailed test.

factor and the interaction were not significant. Examination of the means (See Table 6) and Figure 2 show that the small gap first-borns have higher problem drinking scores than do the corresponding large gap first-borns.

Because the post-gap effect was significant, subanalyses were performed to discover if the effect was similar for both first-borns and middle-borns. A t-test for unweighted means analysis was performed. Table 8 shows that only among first-borns is this effect significant.

Since the only effect that was significant for the problem drinking data was the post-gap effect, when considering the last-borns, it is only necessary to compare them to the large-gap and small-gap groups, rather than to the other birth positions. The appropriate means and standard deviations for this comparison are given in Table 9. Hartley's test yielded $F_{max} = 1.52$ (n.s.) which does not substantiate the use of a transformation. Therefore a one-way analysis of variance was performed on untransformed data; the results are presented in Table 10, demonstrating no differences between the gap sizes on the problem drinking dimension. Although the specific results very somewhat, the general pattern is the same, demonstrating an interaction between birth position and post-gap spacing--with this effect being primarily attributable to the difference among first-borns. The small

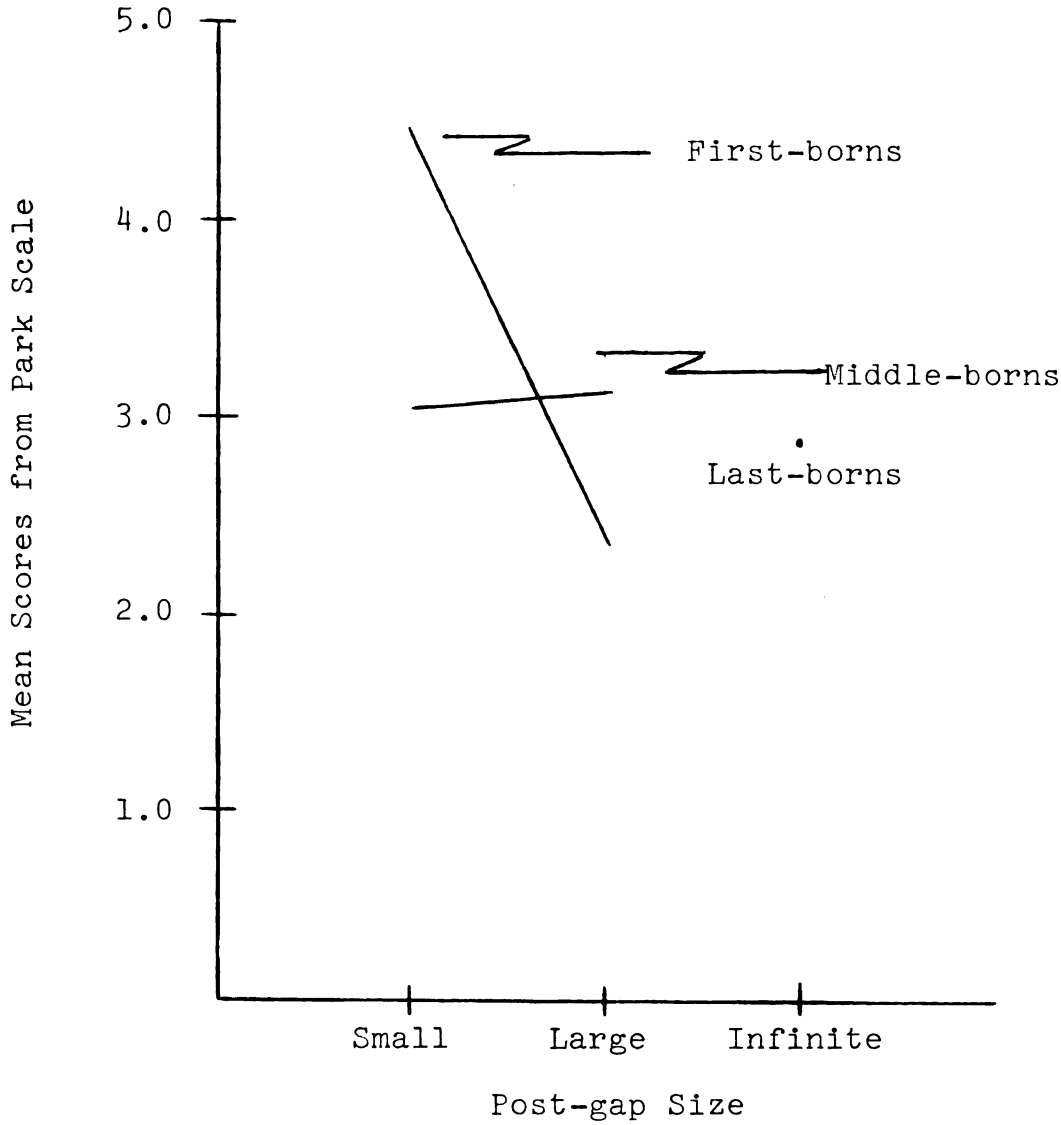

Figure 2.--Park problem drinking scores of first and middle-born subjects as related to size of post-gap.

TABLE 8.--Differences between Park problem drinking means for hypothesis 1a.

Classification	Difference	t
First-borns:		
Small-gap vs. large-gap	2.22	2.70*
Middle-borns:		
Large-gap vs. small-gap	0.19	0.19

*p < .01, one-tailed test.

TABLE 9.--Means and standard deviations of post-gap size groups of Park problem drinking scores for hypothesis 1a.

Classification	Mean	Standard Deviation
Large post-gap	2.74	2.21
Small post-gap	3.96	2.76
Last-born	3.70	2.86

TABLE 10.--Analysis of variance comparing post-gap size groups on Park problem drinking scores.

Source	SS	df	MS	F
Total	757.04	103		
Between	27.64	2	13.82	1.91
Within	729.40	101	7.22	

gap group shows both greater alcoholic intake and greater problem drinking than the large gap group.

Hypothesis 1b was similar to 1a--i.e., the expectation was that post-gap and birth order effects would be found with other measures of orality than those concerned with alcohol consumption. Means and standard deviations for the smoking data are given in Table 11. Hartley's test gave the following: $F_{max} = 15.64$ ($p < .01$) refuting the hypotheses of homogeneity of variance and supporting the use of the Freeman-Tukey Square Root Transformation. After transformation, a 2 X 2 analysis of variance with unequal cell size was performed with the results presented in Table 12. This shows that, as with the alcoholic intake data, the only trend effect is the interaction. Figure 3 demonstrates this effect more clearly and it can be seen that while the small post-gap is associated with increased smoking for the first-borns, it is associated with decreased smoking for the middle-borns.

To discover which differences between means are resulting in the significant interaction, a t-test, similar to the one used in Hypothesis 1a, was applied. Table 13 offers the difference between all pairs of means and indicates which are significant. The means used to compute differences represent transformed data. Similar

TABLE 11.--Smoking means and standard deviations on large and small post-gap first and middle-borns--raw and transformed data.

Classification	N	Raw		Transformed[a]	
		Mean	S.D.	Mean	S.D.
First-born					
large post-gap	23	6.83	20.49	3.15	4.32
small post-gap	14	54.29	80.77	9.32	11.47
Middle-born					
large post-gap	16	22.98	49.55	5.39	8.01
small post-gap	9	12.78	20.43	4.70	5.51

[a]Freeman-Tukey square-root transformation.

TABLE 12.--Analysis of variance on transformed smoking scores birth order and post-gap analysis.

Source	SS	df	MS	F
Total	3891.29	61		
Post-gap	107.10	1	107.10	1.74
Birth-order	20.28	1	20.28	0.33
Interaction	192.13	1	192.13	3.12*
Error	3571.78	58	61.58	

*$p < .10$, two-tailed test.

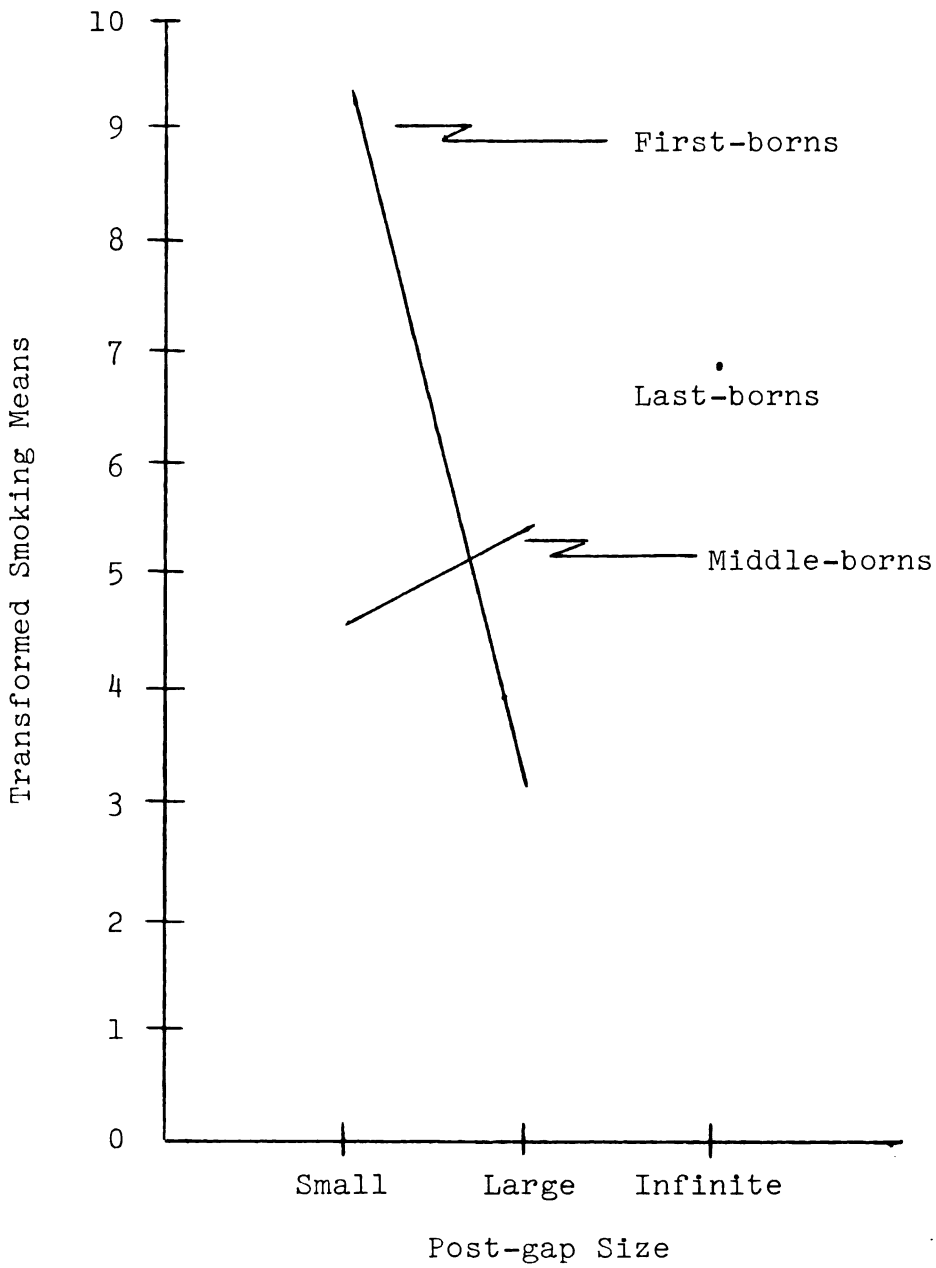

Figure 3.--Smoking scores of first and middle-born subjects as related to size of post-gap.

TABLE 13.--Differences between smoking means for hypothesis 1b--transformed data.

	Firsts large-gap	Middles small-gap	Middles large-gap	Firsts small-gap
Firsts large-gap	---	1.55	2.24	6.17*
Middles small-gap		---	0.69	4.62
Middles large-gap			---	3.93

*t = 2.34, p < .025, one-tailed test.

to the alcoholic data the one significant difference was that between large and small gap first-borns, with greater smoking for the small-gap group.

Because of the significant interaction, it is necessary to consider last-borns as both a birth order and a post-gap variable. Means and standard deviations for both the gap size and birth order groups are given in Table 14. The results of Hartley's test were significant for both (F_{max} = 3.03, $p < .01$ for the birth order comparison and F_{max} = 3.71, $p < .01$ for the gap size comparison). After the Freeman-Tukey Square Root Transformation was applied, a one-way analysis of variance was performed and the results are given in Table 15. As can be seen, there are no differences between any of the birth positions or between any of the post-gap groups. Therefore, as with the alcohol variables, no evidence is found that last-borns differ from any other group on smoking behavior.

For the remainder of the hypotheses no significant effect was found for any analysis. The structure was identical to that in Hypothesis 1; that is, if the test for heterogeneity of variance was significant a Freeman-Tukey Square Root Transformation was performed. As can be seen in Appendix IV this was necessary for the alcoholic intake data of Hypotheses 2a and 3a and the smoking data of Hypotheses 2b and 3b. Then a 2 X 2 analysis of variance for unequal cell frequencies (unweighted means analysis) was carried out and because no effect even

TABLE 14.--Smoking means and standard deviations of later-borns and other birth order and post-gap size groups--raw and transformed data.

	Raw		Transformed[a]	
	Mean	S.D.	Mean	S.D.
Birth order categorization				
First-born	25.48	62.23	5.48	8.39
Middle-born	19.31	41.78	5.14	7.22
Last-born	39.07	72.69	6.89	10.05
Gap size categorization				
Small post-gap	38.04	67.42	7.51	9.86
Large post-gap	13.81	36.71	4.12	6.28
Last-born (Infinite)	39.07	72.69	6.89	10.05

[a]Freeman-Tukey square-root transformation.

TABLE 15.--Analyses of variance comparing birth positions and post-gap size groups on smoking scores (transformed data).

Source	SS	df	MS	F
		Birth Position		
Total	8307.53	103		
Between	62.05	2	31.02	0.38
Within	8245.48	101	31.64	
		Gap Size		
Total	8294.01	103		
Between	220.05	2	110.02	1.38
Within	8073.96	101	79.94	

reached the trend level, the first-borns were compared against the other groups combined for Hypothesis 2. This was done by use of a t-test, and again no effect was found. All of these analyses may be found in Tables V.1 to V.15 in Appendix V. As can be seen, no effect reached the trend level and therefore it is concluded that there is no pre-gap effect, no birth order effect, no interaction effect between these two variables and no interaction effect between pre and post-gap, either for the two measures of drinking behavior or for the measure of smoking behavior.

Because Hypothesis 4a states that family size and problem drinking should increase concomitantly, a correlation would be the most appropriate test of this interaction. Pearson product moment correlations were computed and showed no relationship. The r between quantity-frequency alcoholic intake and family size was -.017; the r between the Park Scores and family size was .07. Neither of the correlations reach the criterion of .22 required for significance at the .05 level, showing that there is no relation between family size and alcoholic drinking behavior.

Hypothesis 4b similarly states that family size and nonalcoholic orality should increase concomitantly. The Pearson product moment correlation between cigarette smoking and family size was -0.13 (n.s.) thus also showing that this relationship does not in fact hold true.

CHAPTER IV

DISCUSSION

Birth Position, Spacing, and Oral Behavior

The results show that the hypotheses concerning the post-gap effect on drinking problems and orality were supported in part and that the hypotheses concerning the pre-gap effect and the pre-post interaction were not supported. Hypothesis 1a was supported by both the quantity-frequency scores and the Park Problem Drinking Scale scores, but the observed results were slightly more complicated than had been anticipated. That is, the post-gap effect only appeared to be related to problem drinking for the first-born adolescents and not for middle-borns. In addition, there appeared to be no differences in problem drinking between any of the birth positions. Similarly for Hypothesis 1b, the post-gap effect was only significant for first-borns when considering smoking behavior. Middle-born adolescents were not affected by length of post-gap and there were no significant differences between any of the birth positions.

It appears then that alcoholic intake, scores from the Park Scale, and amount of smoking are all operating in a similar fashion. For all three measures significant differences were observed in similar comparisons between large and small post-gaps for the first-borns, with the difference being in the direction of greater alcoholic intake, problem drinking, and smoking for the small post-gap than the large post-gap first-born subjects. Additional evidence for the relationships between these three different measures of orality can be ascertained by means of correlation. A Pearson product moment correlation was carried out and the results presented in Table 16. These demonstrate that though the variables are partially independent, they all behave in a similar way.

The question still remains--are these findings relevant to other oral behavior as well, e.g., gum-chewing, kissing, candy sucking, eating, manipulating mouth with fingers, or even talkativeness? Perhaps alcoholic intake and cigarette smoking have some other important factor in common in addition to orality which makes them react similarly. Therefore, to truly conclude that it is the orality component that is important in each, it is necessary to carry out research with the other previously mentioned oral behaviors.

As indicated in the introduction, there already has been some work in this area. Matarazzo and Saslow (1960)

TABLE 16.--Correlations between orality measures.

Criterion measures (N = 99)	r
Quantity-frequency alcoholic intake and Park problem drinking scale scores	.44
Quantity-frequency alcoholic intake and cigarette smoking	.64
Park problem drinking scale scores and cigarette smoking	.70

Note--These correlations are all significantly different from zero ($p < .01$).

found that smokers consume more alcohol than non-smokers. Similar conclusions were reached in the present study even though the two experimental designs were not identical. Matarazzo and Saslow compared smokers with non-smokers on the amount of liquor consumed per week, while this study did not separate smokers and non-smokers but used the measure of number of cigarettes per week as related to alcohol consumption per year. As mentioned earlier, this correlation was .64. In the same manner, Matarazzo and Saslow found that smokers drink significantly more coffee than do non-smokers, providing further evidence for the concurrency of oral behaviors.

Although not concerned with oral behavior as such but with fantasies of an oral nature, Bertrand and Masling (1969) found that alcoholics gave more food responses to the Rorschach cards than a control group, and that, excluding alcohol responses, alcoholics gave more oral dependent responses (e.g., gifts, food organs). Again, the theory that drinking problems and orality are positively related is supported.

Post-gap spacing and its relationship with orality has already been discussed in a previous section (i.e., that oral frustration is more probable when another sibling is born soon after the subject). The fact that the post-gap has been shown in this study to be a more important variable than birth position is supportive of Sampson's (1965) position, namely that the order of birth cannot be

isolated from other important influences. In this context, the present results are in accord with Miller and Zimbardo's (1966) study. While the specific results differ, both studies show the importance of spacing between siblings as an effect that either interacts with, or is more powerful than birth position itself.

While the post-gap effect was found to be important, this study could not confirm the findings of any of the research concluding that birth order in and of itself was a distinguishing criteria for individuals with drinking problems (Bakan, 1949; De Lint, 1964; Martenson-Larsen, 1957; Navratil, 1956; Chen and Cobb, 1960; and Moore and Ramseur, 1960). The results of these studies not only disagree with the present study, but also with each other. This is partly because each study has used a different subject group, (e.g., criminals, in Bakan, clinic patients, in Moore and Ramseur, men, in Navratil, women, in De Lint) and partly because they have divided these subjects into varying groups (e.g., firsts vs. later-borns, in Moore and Ramseur, firsts vs. middles vs. lasts, in Bakan, last-borns vs. the expected frequency of last-borns in Navratil). In addition to these, however, there is also the fact that a particular configuration may be confounded by a peculiar gap characteristic. For example, if the first-borns contained an unusual number of small gap subjects, then a first-born effect would be obtained. In the case of the

last-born the large variability might under certain conditions produce a last-born effect.

In addition to the fact that there is no pure birth order effect, the length of spacing between an individual and his siblings also has no effect unless the individual is first-born in which case the length of the post-gap is significant, shorter post-gaps being related to greater smoking and drinking problems than large post-gaps. This may be the result of either differential weaning or attentional factors, or both. It then becomes necessary to understand why these factors would be effective for first-borns and not middle-borns. It may be that the arrival soon after a first-born of another infant is perceived as much more threatening and anxiety-arousing to the parents than the arrival of a baby soon after a middle-born. With a middle-born the mother is already more comfortable in the mothering situation and feels more confident in her abilities to carry out her duties. The decrease in parental anxiety after each child may become less significant as more children are added to the family since the greatest decrease occurs after the birth of the first child. In the same way, the reduction in attention may not be a linear function of number of children but rather a negatively decreasing function. That is, the birth of the second-born decreases the mother's attention of the first-born more than the third-born decreases her attention of the second-born, and so on, down to the last-born. This may be

primarily a contrast effect--the first-born having had more attention and nurturance in the first place, suffers greater relative deprivation when a sibling is born soon afterward than if a sibling is born soon after a later-born. There may be a point beyond which the birth of another child has negligible effects on the amount of attention the other children receive. The present data suggest that it is only with the first-born that the spacing is of critical importance.

Other data support this line of reasoning. The birth of the first child is greeted with both more anxiety (Schachter, 1959) and more delight (Sears, Macoby, and Levin, 1957) and warmth (Koch, 1955; Bossard and Boll, 1956; and Rosen, 1961) than later-borns. The delight and warmth may be enough to make up for the anxiety, but only if there is enough time to learn to cope with the new parental role before another child is born. If the mother has been unable to meet the infant's needs, the ensuing deprivation may be great enough that the child spends the remainder of his life trying to make up for this lack, displacing his "approach" responses to objects which satisfy his needs without also evoking "avoidance" responses. If this deprivation took its primary form in the frustration of oral needs it may be this area that the individual seeks when he perceives stress. Once the mother has had one child she may be skillful enough at meeting

an infant's needs, both oral and otherwise, that she is less likely to cause a serious deprivation for her later-born children even when they are closely spaced.

Some nonsignificant differences are sufficiently interesting also to deserve some comment. Last-borns show drinking means that are greater than first-borns, evidenced by quantity-frequency scores of 322.87 and 199.60 respectively. The fact that this is not significant ($t = 0.89$) supports the theory that the post-gap--birth order interaction is more important than birth order itself, but the direction of this difference suggests there may be a tendency for this frustration of needs to be slightly greater for last-borns. In addition, when first-borns are broken down according to gap, the small gap (mean = 323.50) adolescents show drinking behavior much more similar to last-borns than do first-borns with a large post-gap (mean = 120.75). Even so, the difference between large and small gap first-borns is significant ($t = 1.85$; $p < .05$, one-tailed test), while the difference between large-gap first-borns and last-borns is not ($t = 1.45$). The reason for the latter results can be found in the considerally greater variance for last-borns compared to that of small-gap first-borns, the ratio being about 2.7 : 1. This occurrence makes it much more difficult to achieve a significant effect. In fact, in all analyses in which last-borns were included, the variance is larger for this group than any other group, whether by gap or birth position. Given this greater

variability, it is conceivable that in some samples a last-born effect would be observed. It remains for further research to isolate what special factors may account for this greater variance of the last-born group.

When the middle birth positions are considered, the data neither demonstrate a gap effect (either pre or post) nor a birth position effect. With regard to oral behavior, the present data suggest that it makes little difference how soon other children are born after the first sibling comes along.

Family Size and Oral Behavior

Neither Hypothesis 4a or 4b (the family size hypotheses) were supported by this study. There was no evidence that there is any relationship between family size and oral behavior--alcoholic or otherwise. These findings substantiate those of Smith (1965) and contradict those of Smart (1963). Smith had originally criticized Smart for overrepresenting the family size of alcoholics by comparing them to census values which publish smaller families than in fact exist in the general population. This study has supported Smith's reasoning and demonstrates that there is in fact no relation between problem drinking and family size.

A positive relationship between family size and orality was predicted in the present study--as family size increases, drinking and smoking behavior should

increase at the same rate. The reasoning behind this was that oral frustration is more likely to occur when the mother has many other children to care for. The results, however, do not support this reasoning. As mentioned in the discussion of gap size and birth order, the most crucial time is after the birth of the first child. As long as the parents have enough time subsequent to the first birth to become comfortable in the parental role and in the satisfaction of needs, it becomes unimportant how many other children are born or how closely they are spaced. While there may be other stress factors at work in large, closely-spaced families, they are not of the type to be influential toward increased orality.

In addition to not supporting the prediction of this study, the results also do not support the findings of Barry, Barry, and Blane (1969). In the Barry et al., study, they found that delinquents from small families engaged in more marked and episodic drinking than delinquents from large families. Conversely in the present study, there is no indication that there is a negative relationship between family size and alcoholic involvement. This discrepancy of findings may be attributable to the fact that in addition to alcoholic involvement, Barry et al.,'s subjects were also characterized by anti-social behavior, a variable that the current study did not consider. In their investigation, the experimenters derived four levels of alcohol involvement

ranging from minimal to marked. Small families were defined as two to four children (there were no only children) while large families were defined as five or more children. Of the small families 23 delinquents were characterized at the two greater levels of involvement as opposed to 12 delinquents in the lesser levels of involvement. The situation was reversed for the large families--12 delinquents were designated as having greater alcohol involvement while 17 were designated as having lesser involvement. It is unknown if these differences are significant but the trend is in the direction of adolescents from smaller families having greater alcoholic involvement than adolescents from large families. Barry et al., were more concerned with position of birth, however, and emphasized the fact that in large families these delinquents came more often from the first-half of the sibship while in small families they were more often in the second half. The present study did not investigate the interaction between family size and position of birth so there is neither confirmation nor contradiction offered for these findings.

In conclusion, it is evident that further research is indicated to fully understand the dynamics underlying drinking behavior of adolescents. This study did reveal, however, that the length of the space between a first-born and his next younger sibling is a significant contribution to his later drinking habits. The shorter age-space may

lead to an increase in pathological orality because of the increased frustration of oral needs and/or environmental stress caused by the decrease in attention on the part of the mother.

CHAPTER V

SUMMARY

This study was concerned with the relationships of birth order, age-spacing between siblings, and family size to alcoholic drinking problems and smoking behavior. Subjects were 104 boys, aged 16 to 18, members of the cross-validation sample of Zucker's (1968a, 1968b) continuing research on the development of problem drinking among adolescents. Quantity-frequency scores of alcoholic intake, scores from the Park Problem Drinking Scale, and cigarette smoking information, were obtained from questionnaires. Birth order, sibling space, and family size were collected from this same questionnaire. Subjects were divided into groups--first-borns into large (more than 24 months) and small (0-24 months) post-gap (space between self and next younger sibling), last-borns into large (more than 24 months) and small (0-24 months) pre-gap (space between self and next older sibling), and middle-borns into both large and small post-gap, as well as large and small pre-gap groups. A 2 X 2 analysis of

variance (unweighted means analysis) was performed to discover significant effects caused by birth order, the two kinds of gaps, and family size on oral behavior. The results demonstrated that there are no main effect differences between birth positions for any measure of orality. Similarly, family size showed no relation to oral behavior. The post-gap effect discriminated significantly for first-borns on quantity-frequency scores, the Park Scale, and cigarette smoking, small gaps showing more of these behaviors than large gaps. These results were attributed to the greater anxiety of parents when children are born too closely after a first-born causing frustration of both oral and attentional needs. Attention was also directed to the importance of gap as a partial determinant of birth position effects in earlier studies, which may account for some of the discrepancies in the earlier literature.

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APPENDICES

APPENDIX I

QUANTITY-FREQUENCY MEASURE OF ALCOHOLIC INTAKE

QUANTITY-FREQUENCY MEASURE
OF ALCOHOLIC INTAKE

Within the last year or so, how often do you usually have any kind of beverage containing alcohol (like wine, beer, whiskey, liquor or a mixed drink)? (CHECK ONE ANSWER)

		Coded Value (No. Occasions Per Year)
a.	Once a day or more	(364)
b.	About four to six times a week	(260)
c.	About one to three times a week	(104)
d.	About two or three times a month	(30)
e.	About once a month	(12)
f.	A few times a year	(6)
g.	About once a year	(1)
h.	Less than once a year	(0.5)
i.	Only tasted alcoholic beverage	(0)
j.	Never tasted alcoholic beverage	(0)

When you're drinking, what kind of beverage are you most likely to have?

a. Beer

b. Wine or a punch containing wine

c. Whiskey or Liquor (or mixed drinks such as cocktails or highballs)

d. About half the time Beer, and half the time Wine

e. About half the time Wine, half the time Whiskey or Liquor

f. About half the time Beer, half the time Whiskey or Liquor

For each of the three beverages the following question was asked:

If you drink Beer, Wine (or punch containing wine), Whiskey or Liquor (or mixed drinks) at all, how much do you usually drink at one time: (CHECK ONE ANSWER)

	Coded Value (No. Standard Drinks)*
a. Never drink beer wine whiskey or liquor	(0)
b. Less than one can or bottle one glass one drink (or cocktail, or shot or highball)	(0.5)
c. About one glass can or bottle drink	(1)
d. Two cans or bottles glasses drinks	(2)

*Following Straus and Bacon (1953), the following conversion scale was used: one 12 oz. can of beer = one 5 oz. glass of wine = one shot of 45% whiskey. This scale provides essential equivalence between drinks, in terms of the amount of alcoholic content they possess.

e. Three
   glasses
   cans or bottles . . . . . (3)

f. Four to six
   glasses
   cans or bottles . . . . . (5)

g. Seven to nine
   glasses
   cans or bottles . . . . . (8)

h. More than nine
   glasses
   cans or bottles . . . . . (10)

APPENDIX II

PARK PROBLEM DRINKING SCALE

PARK PROBLEM DRINKING SCALE

(Subject answers yes or no)

1. Have you ever felt that you might become dependent on or addicted to the use of alcoholic beverages?

2. Have you ever feared the long range consequences of your own drinking?

3. Do you like to be one or two drinks ahead without others knowing it?

4. Have you ever gone on the water wagon (stopped drinking completely for a period of time) as the result of self-decision or the advice of your family or friends?

5. Have you ever gone on a week-end drinking spree (been high or tight most of Saturday and Sunday with nothing worse than a hang-over on Monday)?

6. Do you usually drink to comply with custom--that is, because other people are, or because its polite or the socially acceptable thing to do?

Score one if any of the following questions (7a-7f) is answered yes:

7a. Have you ever been arrested or detained or charged because of drunken driving or other behaviors resulting from drinking?

7b. Have you ever come before school authorities in connection with drinking?

7c. Have you ever had alcohol interfere with your preparation for classes or exams?

7d. Has the use of alcohol ever caused you to miss appointments?

7e. Has the use of alcohol ever caused you to not be able to afford other things because of the expense of liquor?

7f. Has the use of alcohol ever caused you to lose close friends or other friendships?

Score one for each "yes" answer:

8. Have you ever gotten into a fight or damaged property while you were drinking?

9. Have you ever had a drink or two before or instead of breakfast?

10. Have you ever drunk so much that you could not remember afterwards some of the things you had done?

11. Have you ever had some drinks when you were alone?

12. Have you ever been drunk?

13. Drinks one or more times a week and on the average consumes at least four drinks per occasion. (Determined from subject's drinking reports.)

APPENDIX III

FREQUENCY OF SMOKING BEHAVIOR

FREQUENCY OF SMOKING BEHAVIOR

How many cigarettes (or pipes, or cigars) do you smoke now? (CHECK ONLY ONE)

		Coded Value (No. Occasions Per Week)
a.	More than a pack (or more than 20) a day . . .	(200)
b.	About a pack (or 20) a day	(150)
c.	About 10-19 a day.	(100)
d.	About 5-9 a day.	(50)
e.	About 1-4 a day.	(15)
f.	Less than one a day, but more than three times a week	(5)
g.	One to three times a week.	(2)
h.	One every few weeks.	(0.5)
i.	Once a month or less	(0.2)
j.	I don't smoke at all	(0)

APPENDIX IV

HARTLEY'S TEST FOR HYPOTHESES 2a, 2b, 3a, AND 3b

TABLE IV.1.--Hartley's test for hypotheses 2a, 2b, 3a, and 3b.

Criterion	F_{max}	p
2 X 2 Analysis of Variance, Pre-gap and Birth Order Analysis, Alcoholic Intake	57.20	.01
First-borns vs. Later-borns, Alcoholic Intake	3.04	.01
2 X 2 Analysis of Variance, Pre-gap and Birth Order Analysis, Park Scores	2.00	n.s.
First vs. Later-borns, Park Scores	1.15	n.s.
2 X 2 Analysis of Variance, Pre-gap and Birth Order Analysis, Smoking Scores	19.31	.01
First-borns vs. Later-borns, Smoking Scores	1.22	n.s.
2 X 2 Analysis of Variance, Pre-gap and Post-gap for Middle-borns, Alcoholic Intake	1645.78	.01
2 X 2 Analysis of Variance, Pre-gap and Post-gap for Middle-borns, Park Scores	1.90	n.s.
2 X 2 Analysis of Variance, Pre-gap and Post-gap for Middle-borns, Smoking Scores	14.93	.05

APPENDIX V

TABLES FOR ANALYSIS OF DATA IN HYPOTHESES 2 AND 3

TABLE V.1.--Alcoholic intake means and standard deviations on large and small pre-gap middle and last-borns--raw and transformed data.

Classification	N	Raw		Transformed[a]	
		Mean	S.D.	Mean	S.D.
Middle-born					
large pre-gap	11	243.41	507.47	21.75	22.42
small pre-gap	14	92.57	144.94	13.88	13.39
Last-born					
large pre-gap	35	288.88	705.62	20.94	26.81
small pre-gap	8	595.06	1096.24	29.22	39.09

[a]Freeman-Tukey square-root transformation.

TABLE V.2.--Analysis of variance on transformed alcoholic intake scores birth order and pre-gap analysis.

Source	SS	df	MS	F
Total	46924.93	67		
Pre-gap	0.51	1	0.51	0.00
Birth order	672.42	1	672.42	0.95
Interaction	830.65	1	830.65	1.17
Error	45421.35	64	709.71	

TABLE V.3.--Alcoholic intake means and standard deviations of first and later-borns--raw and transformed data.

Classification	Raw		Transformed	
	Mean	S.D.	Mean	S.D.
First-borns	199.60	390.14	18.58	20.82
Later-borns	277.13	680.29	20.59	23.01

t = 0.43 (n.s.) for transformed data.

TABLE V.4.--Park problem drinking score means and standard deviations on large and small pre-gap middle and last-borns.

Classification	Mean	Standard deviation
Middle-born		
large pre-gap	3.54	2.19
small pre-gap	2.78	2.01
Last-born		
large pre-gap	3.88	2.88
small pre-gap	2.88	2.80

TABLE V.5.--Analysis of Variance on Park problem drinking scores birth order and pre-gap analysis.

Source	SS	df	MS	F
Total	464.09	67		
Pre-gap	9.94	1	9.94	1.40
Birth order	0.64	1	0.64	0.09
Interaction	0.00	1	0.00	0.00
Error	453.51	64	7.09	

TABLE V.6.--Park problem drinking means and standard deviations for first and later-borns.

Classification	Mean	Standard deviation
First-born	3.25	2.82
Later-born	3.48	2.63

t = 0.41, n.s.

TABLE V.7.--Smoking means and standard deviations on large and small pre-gap middle and last-borns--raw and transformed data.

Classification	Raw		Transformed[a]	
	Mean	S.D.	Mean	S.D.
Middle-born				
large pre-gap	56.77	56.81	7.36	9.00
small pre-gap	8.23	17.48	3.40	4.75
Last-born				
large pre-gap	38.00	71.67	6.07	10.16
small pre-gap	43.75	76.80	7.36	11.05

[a]Freeman-Tukey square-root transformation.

TABLE V.8.--Analysis of variance on transformed smoking scores birth order and pre-gap analysis.

Source	SS	df	MS	F
Total	5938.84	67		
Pre-gap	42.81	1	42.81	0.47
Birth order	42.81	1	42.81	0.47
Interaction	57.58	1	57.58	0.64
Error	5795.64	64	90.56	

TABLE V.9.--Smoking means and standard deviations of first-borns and other birth positions.

Classification	Mean	Standard deviation
Middle and last-borns combined	31.80	63.83
First-borns	25.48	62.23

t = 0.51, n.s.

TABLE V.10.--Alcoholic intake means and standard deviations on large and small pre--and post-gaps for middle-borns--raw and transformed data.

Classification		Raw		Transformed[a]	
		Mean	S.D.	Mean	S.D.
Large post-gap					
Large pre-gap	7	324.00	574.68	25.91	25.03
Small pre-gap	8	64.62	98.07	12.07	10.71
Small post-gap					
Large pre-gap	4	21.38	14.16	8.24	4.39
Small pre-gap	6	129.83	183.76	16.29	15.98

[a]Freeman-Tukey square-root transformation.

TABLE V.11.--Analysis of variance on transformed alcoholic intake scores middle-born pre--and post-gap analysis.

Source	SS	df	MS	F
Total	7203.59	24		
Pre-gap	48.86	1	48.86	0.15
Post-gap	263.63	1	263.63	0.82
Interaction	119.89	1	119.89	0.37
Error	6771.21	21	322.44	

TABLE V.12.--Park problem drinking means and standard deviations on large and small pre--and post-gaps for middle-borns.

Classification	Mean	Standard deviation
Large post-gap		
large pre-gap	3.88	2.26
small pre-gap	2.50	2.03
Small post-gap		
large pre-gap	2.25	1.64
small pre-gap	3.17	1.95

TABLE V.13.--Analysis of variance on Park problem drinking scores middle-born pre--and post-gap analysis.

Source	SS	df	MS	F
Total	98.63	24		
Pre-gap	0.29	1	0.29	0.07
Post-gap	1.34	1	1.34	0.32
Interaction	7.70	1	7.70	1.81
Error	89.30	21	4.25	

TABLE V.14.--Smoking means and standard deviations on large and small pre--and post-gaps for middle-borns--raw and transformed data.

Classification	Raw		Transformed[a]	
	Mean	S.D.	Mean	S.D.
Large post-gap				
Large pre-gap	59.69	63.86	7.88	9.89
Small pre-gap	6.28	16.53	2.72	4.35
Small post-gap				
Large pre-gap	12.99	21.65	4.30	5.72
Small pre-gap	10.83	18.35	4.90	5.08

[a]Freeman-Tukey square-root transformation.

TABLE V.15.--Analysis of variance on transformed smoking scores middle-born pre--and post-gap analysis.

Source	SS	df	MS	F
Total	1229.20	24		
Pre-gap	38.01	1	38.01	0.70
Post-gap	5.54	1	5.54	0.10
Interaction	40.75	1	40.75	0.75
Error	1144.90	21	54.52	