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Binocular resolution and the perception of certain sports stimuli as a function of identification class.

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BINOCULAR RESOLUTION AND THE PERCEPTION OF CERTAIN SPORTS STIMULI AS A FUNCTION OF IDENTIFICATION CLASS

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Abstract

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The problem of whether sex identification class (male or female) biased perception and binocular resolution toward sports stimuli, as opposed to nonsports stimuli, was examined in samples of thirty male and female subjects. The sports stimuli presented were track and field, curling, lacrosse, baseball, ice hockey, basketball, and football.

Results confirmed that the male class-resolved binocular rivalry and perceived sports stimuli significantly more often than neutral (nonsports) stimuli ($\chi^2 = 13.40$; $p = < 0.01$). Interclass variations in resolution and perception confirmed at $p = < 0.01$ that the male identification class perceived sports stimuli significantly more often than did the female class. A significant association, $C = .52$; $p = < 0.01$ between one's identification class and perceptual dominance of images was clearly revealed. Sports image dominance and the male class were highly related as were neutral image dominance and the female identification class.

Findings substantiated transactional functionalism's theoretical position on perception. Sophistication of the apparatus for subsequent studies of learned behavior, language acquisition as this related to differential

class behavior, response variations to identical stimulus exposures and supplementary attitude assessment are cited as factors relevant to future research employing similar methodology.

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CHAPTER I THE PROBLEM

Statement of the Problem

The importance of the present study arises from a realization that an understanding of the functional role of sports in Canadian and other cultures will arise only through an integration of theories and research from the areas of sociology, psychology and physical education. This study demonstrates that the function of sports is associated with cultural influences and sex identification classes as a manifestation of these influences. Identification processes, as they refer to persons, is used throughout as a more appropriate term than that of reference groups, which is limited in scope and ambiguous in meaning (La Fave, Haddad, Marshall, 1970). Sports or athletics, to the present period have been male-dominated in Canadian and other cultures. In Scandinavia, participation in sports is considered a primary factor in the socialization of young boys (Helanko, 1957), but in few cultures has this been attempted in educating the female (Luschen, 1967). Sports consumption, whether active or passive, is geared to the male sub-culture at all age levels. Newspapers, magazines and books constantly report the exploits of males in all forms of sports. Sports broadcasts, on television and radio, plus most activities attended by individual spectators, are concerned with male sports. Tiger (1969) considered the public concern for and emphasis on male sports another indication of "male bonding" to the exclusion of females. Sports and

athletic participation is appropriate male gender behaviour conducive to the male identification class formation. The extent of female participation is governed by the female role-behavioral pattern and identification class in culture. Sports are not a vital socializing agent among females in any culture examined to date.

Male and female identification classes reflect divergent socio-psychological behavior or models, thus response differences in the individual male and female are to be noted. Socialization has directed individual development so that a male comes to value highly the male sub-culture norms and the female attitudes conform to the values of her respective class. The attitudes toward stimulus objects suitable for the male and female from a given culture should therefore exemplify their appropriate sex identification classes.

Generally, males are more familiar with sports, due to past experiences in participation and involvement, in the cultures under study. As a masculine trait, sports has greater value and significance among males. A generalized male self-system, or stereotype, may be regarded as ego-involved (Sherif and Sherif, 1969) with sports. A typical female's identification class may view sports with attitudes of rejection or noncommitment (Sherif and Sherif, 1969). Ego-involvement among females is minimal relative to that of males in regard to sports. While individual variance occurs, between identification-class differences at a higher level has been made a basic post-

ulate in this study.

The assumption that males are more ego-involved with sports than females (because of differing demands made upon the sexes) underlies this study. The selective process of visual perception rests on the assumption that males in such cultures will be more receptive to sports stimuli (and females less receptive to such stimuli). By utilizing the phenomenon of binocular rivalry, this study investigated the perception of certain sports stimuli as a function of an individual's identification class.

Binocular (retinal) rivalry was induced by means of a stereoscope which simultaneously presented two different images (one sports, one neutral) to the monocular fields of the perceiver. The resulting retinal competition was resolved by one image emerging as dominant in the visual field. In situations of stimulus-ambiguity, as in binocular rivalry, perceptual response relies upon the functional value of the stimuli to the perceiver. This principle of the transactional theory of perception (Kilpatrick, 1951, 1961) when applied in the present study indicated that the dominant image emerging from the rivalry field would be the stimulus having the greatest meaning or value for the observer. Lacking relevant meaning, the other image tends to be suppressed, either completely or partially. Sports stimuli presented in a rivalry situation should reveal class differences reflected in the perceptual responses of members of the two sex identification classes.

Limitations of the Study

The use of volunteer subjects drawn from the students attending Summer School at the University of Windsor imposed limitations on the generalizability of the findings (Rosenthal and Rosnow, 1969). Sub-classes, such as female physical education students and female athletes, were unavailable as subjects. The exclusion of these sub-classes eliminated possible bias of results. Their close association with sports and athletics raises questions regarding their acceptance and rejection of values from their own female identification class and those of the male class. Thus, the nature of these females' identification class must be established before any discussion on their functional role as sports women in societal structure can be advanced. However, considering their sports involvement, one would hypothesize that such females would perceive sports images as dominant.

Another limitation involves the sports activities selected as stimuli. The sports of track and field, lacrosse, curling, hockey, basketball, football and baseball were clearly not to be interpreted as representing all sports activities currently occurring in Canada. Rather, they comprise sports judged by the experimenter as being most common, most structured and most widely presented by the media to the general public either actively or passively involved.

The presentation of stimuli in pairs necessitated the balancing of physical properties between stimuli so

that perceptual dominance would not be due to differences in the qualities of brightness, color, texture or form, and so forth. Images or visual slides were equated physically as best as possible, with the means available; however, a perfect balance among stimuli was virtually impossible. The nominal scale of measurement, despite its weakness as a form of data, served the purposes of this exploratory study. It is hoped that a step to encourage research into the problems of sex and sport in culture has been made and it is further hoped that the use of more sophisticated techniques and higher scales of measurement will be used to increase the power, significance and generalizability of such studies.

Definition of Terms

1. Binocular (retinal) rivalry:

   This represents the stimulation of the two eyes by two patterns which are sufficiently different to make fusion of the images impossible. This creates a visual competition by the images between the two eyes.

2. Monocular dominance (dominant image):

   Monocularly dominant images are those which consistently exert their presence in the respective field, according to the verbal report of the perceiver. The other monocular image is usually partially or wholly suppressed.

3. Binocular resolution:

   This represents the outcome or actual perception of

the dominant stimulus by the subject in the rivalry situation.

4. Alternation:

This is the continuous coming and going of the left and right monocular field image during a viewing exposure of long duration.

5. Stereoscope:

By definition, a stereoscope is an optical instrument used to combine two pictures of the same object taken from slightly different points of view; thereby giving the impression of a single picture having depth. For present purposes two photographic slides or images of different content are used to create rivalry by inhibiting fusion.

6. Identification class:

This is defined as cognitive sets of elements which are attitudes of the subject, and represent a proper subset of his/her attitudes (La Fave, Haddad, Marshall, 1970). In this study the subset component refers to persons, namely males and females.

7. Ego-involvement:

According to Sherif and Sherif "ego-involvement refers to the arousal of a situationally relevant ego-attitude, whose participation in ongoing psychological activity generates modes of behavior that are more consistent, more selective, and more characteristic of the person in that respect."

(1969, p. 387).

8. Neutral stimulus:

This represents a photographic slide depicting situations, objects or events judged by a panel to be neither masculine or feminine in content appeal.

CHAPTER II REVIEW OF THE LITERATURE

Theoretical Background

Historically, several theoretical positions have been advanced to explain how and why things appear to us as they do. Classical and contemporary theories can be readily grouped according to their primary emphasis on experimental evidence, philosophical trends, physiological origins, and generally, the problem of nativism versus empiricism.

Titchener's core-context theory (Allport, 1955) emphasized a focal group of sensations called the "core". Accompanying this sensory core is the "context" or secondary sensations supplied by past experience. Different individuals all possess the same core; however, one's context, and thus meaning of perception is looked upon as an individual quality associated with differing past experiences. Boring (Allport, 1955) also advocates this core-context theory of perception. Meaning in perception is solely derived from the context; the core is devoid of any meaning. Core-context theory fails to illuminate the dynamic interaction between an individual and the physical and socio-psychological environment.

The Gestalt approach to perception is exemplified by the description and explanation of immediate experiences and the total perceptual field. The concept of form refers to the way things appear to the observer. Once established, forms persist within the perceiving organism independent of the stimulus. Nativistically oriented, the gestalt system as a whole has neglected motivational forces and

perceptual meaning related to objects and situations. The phenomenological generalizations of the theory are however, supported by experimental findings, but an almost complete lack of physiological support for the existence of isomorphic configurations in the nervous system or brain must be noted.

Werner and Wapner's sensory-tonic field theory (1952, Allport, 1955) proposed the incorporation of the perceiving organism's tonic state along with the sensory aspect as vital to perception and meaning. Methods of spatial placement and perceived motion, although supporting the theory, proved too narrow for generalization to other perceptual phenomena. Demonstration of the link between the tonus situation with meaning in perception have, so far, not been adequate. A common deficiency among existing theories has been the lack of a clear explanation of the assignment of meaning in the perceptual process. What an object, event or situation signifies is clearly a relevant cue to response, particularly in social situations. The explanation of meaning in terms of "significate" and "sign of the significate" (Osgood, Suci, Tannenbaum, 1957) was integral to the present study and its theoretical basis. Words, as symbols to represent objects and the object itself are clearly different stimuli; however, the sign (word) should elicit behavior similar to that which the significate (actual object) should bring forth (Osgood, Suci, Tannenbaum, 1957). Signs functioning as cues representing real objects, events or situations, are meaningful in perception if they

educe responses similar to those produced by the significate object.

The present study followed the theoretical approach labelled transactional functionalism (Ittelson and Cantril, 1954; Ittelson, 1954, 1968; Kilpatrick, 1951, 1961). Central to this theory is the dynamic interrelationship between the organism and environmental cues. Perception, as a response to a fixed stimulus is discarded; during perception a "transaction" between observer and environment is held to occur. The nature of an object or situation can only be assessed by considering both observer and the perceptual cue. Experience plays an important role in perception. Past actions which have satisfied the organism's purposes have resulted in significances being attached to these actions. Unconscious "assumptions" are built around significant environmental cues; these serve as directions for present and future actions involving identical or similar stimulus - cue patterns. Perception becomes guided by one's unconscious assumptions of probable significances for action.

Differences in past experiences will thus produce variance in assumptions, and thus, perception. However, despite each man's experiences and significances attached to such, universal assumptions and perceptions are possible when common purposes and actions have existed among individuals. Perceptions based on social motives, norms and values, especially when these are associated with identification classes may elicit a common or class response.

Young boys socialized along a cultural stereotype emphasizing sports-athletics can be expected to develop a familiarity with and attitudes towards sports as members of a male subculture. Sports involvement serves the culturally-defined purposes of masculinity in culture (Moss and Kagan, 1961; Porter, 1967). Assumptions, according to the transactional functionalist, about the positive values of sports will then develop and find a place in the typical male's hierarchy of values. On the other hand, members of the female identification class will form attitudes of rejection or noncommitment as regards sports. Familiarity, meaning and ego-involvement direct one's perception of sports cues in the environment.

Ames' experiments (Ittelson, 1968), and those of others (Kilpatrick, 1961), although not always employing real-life situations or significates, nevertheless used the sign of the significate as the behavioral cue. A sign, for example a picture, has meaning which transcends the limits of the cue itself and reaches the reality of the significate. Experiments by Ames gave support to transactional functionalism; a rotating trapezoid appeared to subjects as a rectangular window, despite the fact that the retinal image was shown to be trapezoidal (Ames, 1961). Past experiences associated with the rectangular shape of environmental objects at differing viewing points have resulted in the unconscious assumption that the perceived trapezoidal relates to these and is therefore rectangular. This is the most likely significance of the cue as rel-

ated to familiarity, experience and purpose of the organism in his/her environment. Similar findings have been observed in experiments employing cue-ambiguous patterns. Points of light, equi-distant from the subject yet unequal in brightness intensity, resulted in subjects perceiving the brighter light as nearer. The subjects assumed that the lights were of equal brightness, and therefore, the objectively brighter source was nearer. Subjects responded subjectively from assumptions accumulated from past experiences in similar situations (Ittelson, 1968). A binocular rivalry study by Bagby (1957) gave support to the position of the transactional school. Subjects from different cultures perceived those stimuli representing experiences specific to their own culture and environment; familiarity predisposed the subjects' resolution of the rivalry situation. Engel (1956), using the rivalry situation, predicted outcomes in line with the degree of familiarity subjects possessed about certain stimuli.

Segall, Campbell and Herskovits (1966), studying the susceptibility to geometric illusions among cultural groups, concluded that one's visual habits relate to the functional significance of the cultural and physical environment of each group. Pettigrew, Allport and Barnett (1958) found that subjects familiar with and/or a member of a particular group were most accurate in their resolution of visual rivalry situations. Toch and Schulte's study (1961) on the readiness of trained police personnel to perceive violence more readily than non-police personnel lends

further experimental support to transactional functionalism as an explanation of perception, and to the value of binocular rivalry as a means of investigating such problems. Binocular rivalry is essentially a stimulus-ambiguity situation; in the present study a stimulus overload was induced and resolution was determined by the assumptions, probable significances and familiarity of sports stimuli for members of the sex identification classes.

Games, Play, Sports and Sex-Typing

Much of the literature on the interaction between culture and sex deals with aspects of sex-typing and sex-appropriate choices in behavioral patterns. The former term refers to the process by which individuals develop behavioral roles expected of his/her own sex (Mussen, 1969, p. 708). Of course, such typical behaviors are largely determined by societal and cultural demands; preferences for certain activities are considered appropriate only if they conform to these norms for behavior. Masculinity-femininity studies have been largely responsible for delineating the appropriateness of behavioral patterns among males and females. Within the context of M-F scales, sports and other related activities have received attention because they gave direction to the contrasting behavioral characteristics displayed by the sexes. Data related to the interest and practice of play, games and amusements were investigated in the development of early masculinity-femininity scales (Terman and Miles, 1936). Since then,

various types of scales and techniques have attempted to distinguish sex-appropriate behavior and play preferences of the sexes based upon the influence of the processes of socialization and sex-typing.

Sutton-Smith and Rosenberg (1963) studied how play activity preferences of preadolescent boys and girls differed. Their measuring instrument consisted of a 180-item play scale on which children indicated a like or dislike for play items at which they played ignoring those items designating games at which they did not play. Results indicated that playing games and sports was a masculine pattern positively associated with the male sex-role. Responses of girls to the scale were interpreted as a "sign of confusion" or indication of a greater sex-role flexibility for females in culture. In a similar study, Rosenberg and Sutton-Smith (1960) found support for the hypothesis that there is an increasing masculinization of the female sex-concept: girls showed a greater preference for play roles previously reserved for males. The authors stated that, along with this expansion of the female role, there is an accompanying contraction of the male role: young boys concentrated on a smaller variety of play activities. This, however, was not regarded as an indication of a reduced interest on the part of males; the strong masculine quality connected with play items still existed but was now being infiltrated by girls.

When considering sex-role definitions, one must also keep in mind that this involves age-role definitions

(Hartley, 1964). Sex-roles at one age are usually specific to that age. For instance, a child of five will implement role-appropriate behavior for this age and sex; however, the same individual's sex-role at age twenty-five must implement qualities appropriate at this level. Relevant here is a change in attitude toward what is considered appropriate and inappropriate as one develops, matures and becomes socialized.

Hartley and Hardesty (1964), studying children's perceptions of sex-roles, found that playthings and play activities were the best indicators of sex-roles in childhood. Young girls engaged in sex-role activities which paralleled the traditional adult female-role activities, but young boys were found to parallel adult activities to a lesser degree. Lynn (1959), also studying sex differences and masculine-feminine identification, found that males identified with a masculine cultural stereotype whereas females identified with the mother's role specifically. This research also reported greater pressure upon males to conform to the cultural stereotype than upon females to adopt the appropriate female role. This indicated a greater flexibility for females in their role adoption. Girls can and do adopt more readily roles of the opposite sex without being sanctioned by society; however, males have little, if any, freedom to adopt or identify with female sex-roles without incurring ridicule and negative reinforcement.

This was replicated by Schell and Silker (1968) who

described the male sex-role as more definite and rigid than the female sex-role. As a result, girls were allowed to imitate boyish behavior, but not vice versa. Sissiness on the part of boys is a deviation from the norms of masculinity, but female tomboyishness is quite acceptable in a culture which gives greater prestige, power and attractiveness to the male sex-role. Webb's (1963) study adds support to this finding of greater flexibility in female behavior. This flexibility is an outcome of the permissiveness allowed in the female during the early developmental years. Ward (1968) presented similar findings on sex-role latitudes of acceptance and rejection.

Thus sex-typing, socializing males and females, is initiated early in the developmental stage. Preadolescent boys must conform to a rigid masculine sex-role which includes play and sports as vital components. Female role patterns permit flexibility, often overlapping into male areas of play behavior. This flexibility disappears with increasing age. Masculine sex-role rigidity is maintained, but now greater female conformity to cultural demands of femininity is demanded. Attitude changes, in accordance with one's identifications, result in adolescents and adults becoming more selective in choosing behavior appropriate for males and females in a given culture.

In an extensive study of masculinity-femininity, Terman and Miles (1936) found male and female interests differed significantly. Sports, mechanics and science were the most masculine pursuits; feminipity relied upon the

interests of religion, art and domestic arts. Males deviating from the pattern tended to be feminine, and females displayed masculine qualities if they showed interests in typical male ventures. Terman and Miles found interest in sports to be a positive male attribute but a negative female quality.

Summary of Differential Sports Involvement Studies

Many studies into the place of sports activities in childhood, adolescence and adulthood have revealed that these activities predominate among males in the North American culture. Certain studies found preferences for games of physical skill and achievement to be definitely a masculine characteristic, whereas games of strategy and chance were preferred by females (Sutton-Smith and Roberts, 1970; Sutton-Smith, Roberts and Kozelka, 1963). This was attributed to child training techniques: emphasis for males being on achievement training, while females are trained for obedience and responsibility.

Studying the significance of physical activity in the United States, Kenyon (1966) found little support for the hypothesis that males are more actively involved in activity than women. However, as for attending, watching or listening to sports events, men did show a greater interest. Sutton-Smith, Roberts and Kozelka (1963) found low participation among adult females in doing outdoor sports, going out for sports, doing other participating sports, watching sports, attending sports and listening

to sports on the radio.

In Denmark, Andersen and others (1956) found men participated in all forms of sports, whereas women were absent from such activities as football, boxing, wrestling, weight-lifting and cycling. Favorite sports for women were gymnastics, handball and swimming. Fewer males took part in these activities. Nevertheless, the findings suggested that sports, in its diverse forms of presentation and involvement, was principally a masculine behavior. Men read the sports pages more often, a greater percentage of men listened to sports broadcasts, a greater percentage of women had never attended sports activities and men were more often active in sports were some of the findings. Wonneberger (1968) found women participated to a lesser degree in sports and games. Men valued most highly sports which were competitive in nature; however, females preferred gymnastic activities near the home. The female attitude seemed opposed to participation in organized sporting events, particularly team sports before large crowds. Gymnastic exercises at home ranked high as a most desirable type of activity among women. The burdens associated with household duties were cited as a primary reason for the lower rates of female participation.

Sports - Values and Sex-Appropriate Behavior

These differences in rates of participation are best understood in terms of the values and significances attached to sports and athletics by the identification

classes. These values and significances function in an organism's responses to environmental cues pertaining to sports. They comprise the meaning content upon which transactional assumptions about sports and the perception of sports cues are founded.

Coleman's (1960) study of the adolescent subculture in high school indicated the high status conferred upon athletes by young boys and society: asked how they would like to be remembered after leaving school, most boys replied "as a star athlete" as opposed to "brilliant student" and "most popular". Academic achievement ranked well below athletic achievement. Results among the girls were not conclusive; perhaps an indication of the flexibility of the female role. In another study, Coleman (1963) asked subjects their favorite way of spending leisure time. Male responses revealed a preference for sports, athletics and outdoor activities. Non-sports pursuits were preferred by females. Athletic participation was important if boys wanted to be part of the school's leading crowd. This was not so for girls.

Porter (1967) stated that sports met the developmental needs of boys, not girls, during childhood and adolescence. Incapable of achievement characteristic of the adult male population, young boys immersed themselves in the competition and achievement potentialities of athletics (Parsons, 1942). Following cultural expectations, young female behavior expressed sexual attractiveness as a specific value. Moss and Kagan (1961) emphasized the

different sex-related values sports possess:

> To excel at sports is one of the defining characteristics of masculinity. Some boys become involved in athletics in order to maintain their sex-role identity and avoid peer rejection. An athletic girl will be subject to peer rejection for excessive participation in athletics (p. 510).

Clark and Lantis (1958) noted that the way girls, and for that matter boys, see themselves is largely determined by cultural demands for sex-appropriate behavior. Sports, although a high status activity among males, was revealed to be directly opposed to the concept of femininity. As a result, females avoided involvement in sports and athletic competition and pursued the goals of feminine beauty and sexual attractiveness. In the past, opponents of female participation in sports have cited biological reasons to support their objection, however, much of this evidence was a reflection of, and scapegoat for the culturally determined dislike for women engaging in the strictly masculine activity of sports and athletics (Ulrich, 1960). Discussing American culture in particular, Ulrich emphasized that the established relationship between sports and masculinity had given rise to a dilemma for females participating in sports. Such behavior is unfeminine according to the cultural stereotypes of contempory males and females. The result of this is a role-identity conflict and peer group rejection among female participants. This situation extends to the educational sphere in terms of the status and image of female physical educators, and more generally, to problems associated with the teaching of activities of an athletic nature to girls in school.

Tiger (1969) considers "male bonding" a dominant feature in society. Males are characterized by a proclivity to form gangs during adolescence, but particularly in adulthood. During this latter period the bond among males, influencing various aspects of society, becomes most pronounced. Men seek such groups, whereas women do not. Tiger attributes masculine domination of major occupational fields and offices of political importance to this bonding pattern within the male subculture. Sports is another area in which male bonding is focal; thus helping to explain the attraction of team sports in male participants and spectators. Team sports thus exert a strong socializing factor in boys participating within their groups. The specific value and function of sports in society as a socializing agent among young boys received important elaboration by Helanko (1957) in his study of groups in Scandinavia. As youths develop with age, play tends to change into sports: this is accompanied by attitude changes towards activity. Critical to sports development and masculine socialization is the "gang age" between nine and sixteen years. During this phase, sports function as sources of pleasure and individual status. Eventually sports participation facilitates socialization into primary groups, intermediary groups and secondary groups.

Surveying the attitudes of males and females towards sports competition, Harres (1968) found that those individuals who competed in athletics had a favorable attitude

toward such participation for women. However, in general, subjects regarded female involvement in athletic competition as only favorable and not highly favorable. Nigg and Heiderich (1968) carried out extensive research on sports and females in Switzerland. The public attitude, that competitive sports is not feminine, was reflected in their research findings. Females, as spectators, were found to comprise a minority group relative to adults and boys. The authors concluded that a lag existed between societal changes in the concept of femininity and sex-appropriate behavior, and the reality of incorporating these new values into overt behavioral forms, especially in the sports realm. Sports' allocation in the value hierarchy bears valuable data concerning the significance of this form of pursuit. Robinson's (1967) procedure was to investigate the degree of satisfaction males and females obtained from and attached to a variety of eighteen aspects of life. Women ranked sports in sixteenth position, slightly above politics and club activities. Conversely, males located sports quite high on their list, giving it about equal weight as one's living quarters, one's job, helping other people and being with friends. Besides disclosing this variance in values accorded sports by the sexes, results also disclosed males as being more actively involved in sports.

Sports does not carry great significance for females generally. Socialization of females has emphasized the culturally-defined feminine pursuits. It is clear that an

interdependence between the male identification class and sports involvement exists. Undoubtedly, sports' significance is both a contributor to and product of the higher rates of participation among males. The purpose of this research was to demonstrate the effect of identification classes, with their differential sports values, on binocular resolution and perception of specific sports activities using transactional functionalism as the theoretical model. As a research tool binocular rivalry facilitates investigating perceptual selectivity of sports stimuli in male and female identification classes.

The main research hypothesis of this study is: A subject's identification class will determine perception and resolution of certain sports stimuli in a binocular rivalry situation.

CHAPTER III METHODOLOGY

Hypotheses

The appropriate operational hypotheses derived from the main research hypothesis are:

1. Typical male subjects perceive and respond to sports stimuli in a binocular rivalry situation significantly more often than to neutral stimuli.
2. Typical male subjects perceive and respond to sports stimuli in a binocular rivalry situation significantly more often than typical female subjects viewing the same stimuli.

Statistical hypotheses become:

1. (A) Hi: $\bar{X}s > \bar{X}n$
   (B) Ho: $\bar{X}s \leq \bar{X}n$
2. (A) Hi: $\bar{X}ms > \bar{X}fs$
   (B) Ho: $\bar{X}ms \leq \bar{X}fs$

The Subjects

The source of data for the study derives from a finite universe. Two independent samples consisting of 30 male and 30 female students attending the University of Windsor Summer School volunteered as subjects for the research situation. Subjects were recruited by the experimenter; individuals who agreed to a request to participate in a visual perception experiment comprised the two classes of 30 persons each. Individuals who indicated a familiarity with the binocular rivalry technique were excluded from the study on this basis.

Prior to the study proper, 4 male and 4 female volunteers naive to the purpose of the experiment served as judges of the content of photographic slides. These individuals were also students attending Summer School at the University.

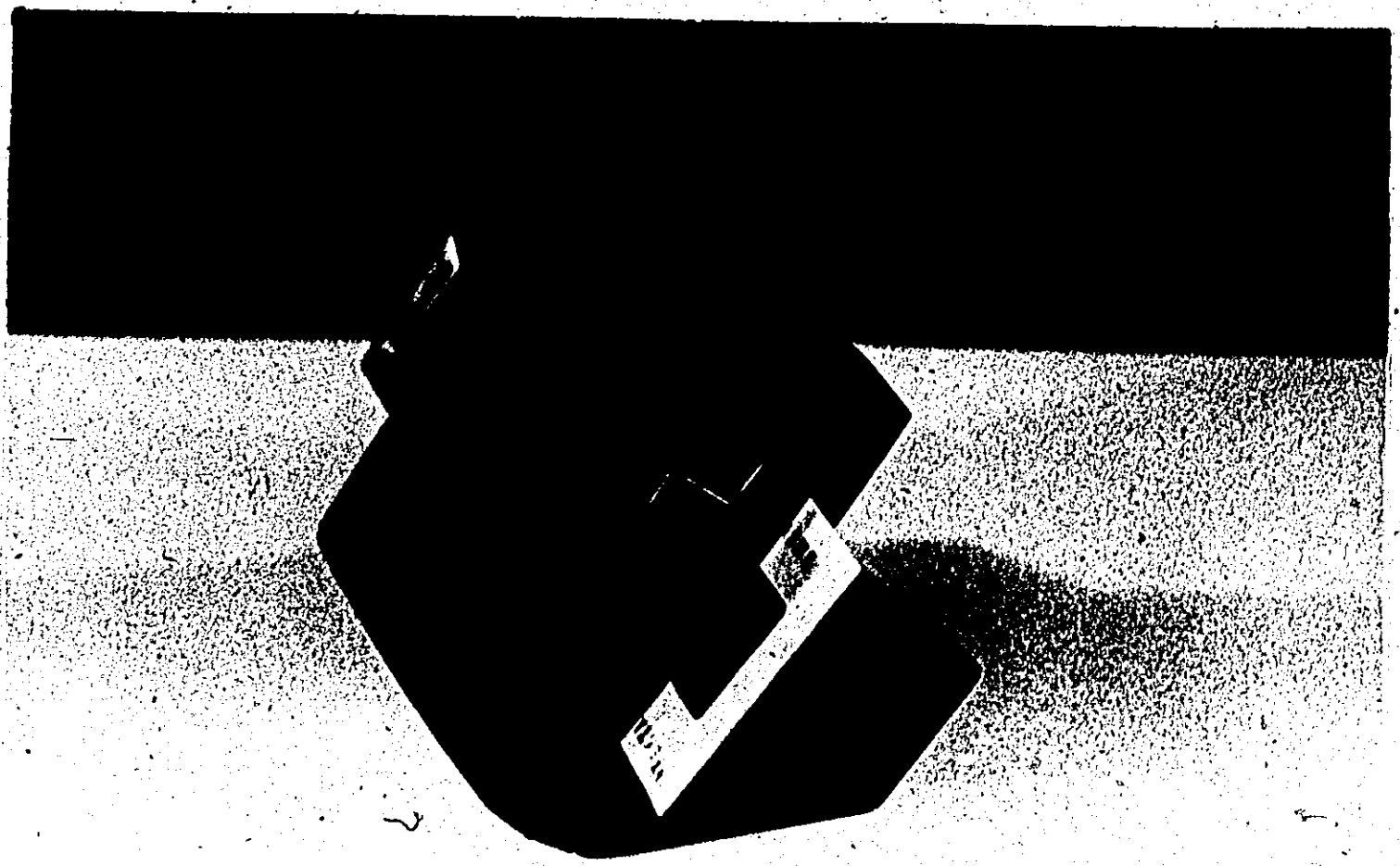
The Test Instrument

In place of the modified stereoscope detailed by Engel (1956), the present study utilized a conventional "View-Master" altered so as to accommodate two 35 mm. photographic slides in a single viewing exposure. PLATE I shows this apparatus.

Viewmasters operate on the principle of binocular fusion of the separate monocular fields, producing a single fused image. The original viewer was dismantled at its seam and the handled disc rotator and spring were removed. So that the structure could accept mounted 35 mm. slides, apertures 2 3/4 inches in length and 1/16th of an inch in width were filed on the right and left side of the viewer. Internally, small plastic guides were glued to the front section containing the frosted plastic light diffusing pieces. Inserted slides will fit securely between these upper and lower guides, thus ensuring proper placement of each image in front of its respective monocular field. To prevent a slide from being inserted too far into the apparatus, and also to facilitate removal after viewing, plastic guides acting as stops were positioned in the walls of the small cylinder occupying the

PLATE I

The Apparatus: A Modified View-Master



center of the front section. With these modifications, the front and back sections of the viewer were refitted.

The source of illumination for viewing slides came from an externally positioned study lamp fitted with a 100 watt light bulb. PLATE II shows the actual viewing position with apparatus and lamp positions.

PLATE II

Testing Situation Showing Subject Position, Lamp and Partition

Stimulus Materials

The stimulus materials consisted of various photographic slides categorized as possessing either neutral or sports qualities. Sports or athletic stimuli were represented by the activities: track and field, lacrosse, curling, ice hockey, basketball, football and baseball. Selection of these activities, which are all facets of Canada's organized sports structure, was made by the

experimenter. Although these sports do not represent the entirety of sports in Canada, these specific activities comprise a cross-section of sporting events characterized by their great prevalence, developed structure, coverage by the mass media, and the reception accorded them by the public through direct and indirect participation.

Operationally a neutral stimulus is one which does not differentiate between males and females by being predominately masculine or feminine in content. The first step in the selection of such neutral stimuli required the collection of a large number of potentially neutral scenes, events, objects or situations. Forty-seven pictures from various sources were prepared as potential stimuli to be judged by a panel of 8 (4 males and 4 females). When projected onto a screen the judges rated each as likely to (1) appeal to males, (2) appeal to females, or (3) be neutral in its appeal. Two males and two females rated the pictures as indicated above. Two males judged according to the written instructions: "Assuming that you are a female, judge the following slides on the basis of whether they appeal to males, females or are neutral in appeal". Similarly, two females were instructed: "Assuming that you are a male, judge . . .". Judges scored pictures as either masculine (M), neutral (N), or feminine (F).

Enumeration of the responses produced 11 pictures which a majority of judges considered neutral in appeal. The final stage of stimulus preparation necessitated the pairing of neutral images with the chosen sports stimuli.

To prevent stimulus dominance due to conspicuous differences in physical properties between paired stimuli, all slides were developed in black and white. Furthermore, picture quality, brightness and content were equated as best as possible to reduce differences in physical qualities. Final neutral stimuli and the pairing arrangement with sports images are illustrated in PLATE III. Of 11 neutral images, 7 were used in the pairing arrangement.

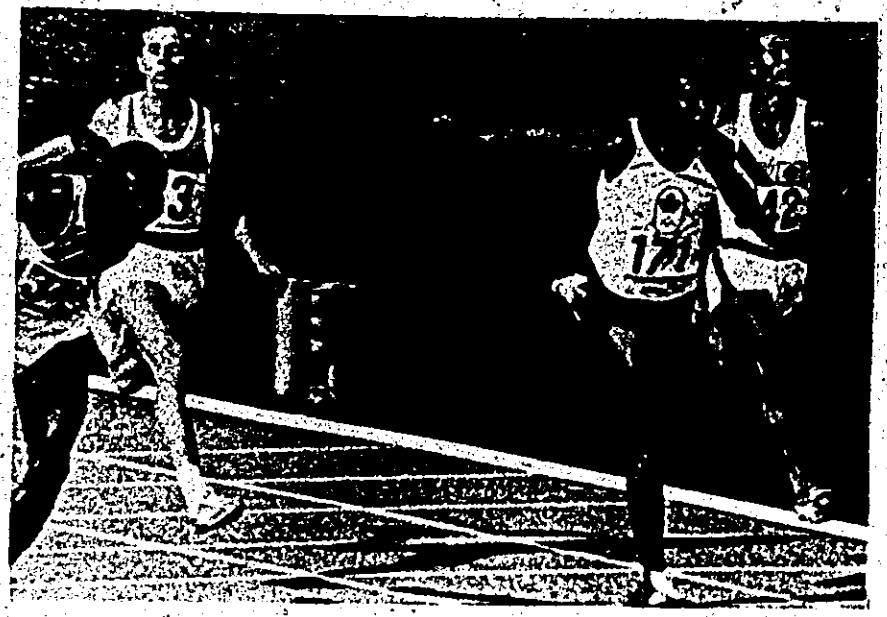
The testing situation employed a small room furnished with a large testing table and a few chairs. External illumination from a large window was prevented by drawn curtains. Each sports and neutral stimulus pair was assigned a number and placed on a presentation guide card, which also denoted the respective monocular field for each stimulus in each pair. Slides were placed in their proper position on this guide to assist the experimenter in ordering stimulus viewing.

PLATE III

The 7 Paired Stimuli as Positioned on the Presentation Guide Showing Monocular Fields and Order

Monocular Fields

Left Eye



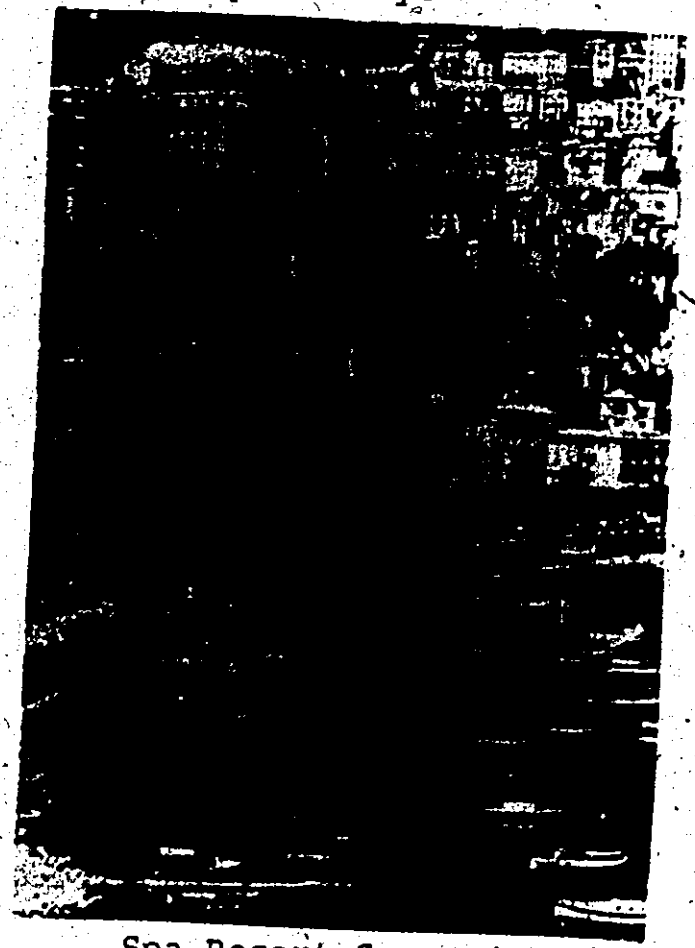
Pair 1 Track and Field (S)

Right Eye

Maple Syrup Scene (N)

PLATE III - Continued

Left Eye



Pair 2

Sea Resort Scene (N)

Right Eye

Curling (S)

PLATE III - Continued

Left Eye

Pair 3

Lacrosse (S)

Right Eye

Man and Woman Scene (N)

PLATE III - Continued

Left Eye

Pair 4 - Living Room Scene (N)

Right Eye

Baseball (S)

PLATE III - Continued

Left Eye

Right Eye

Pair 5 Hockey (S)

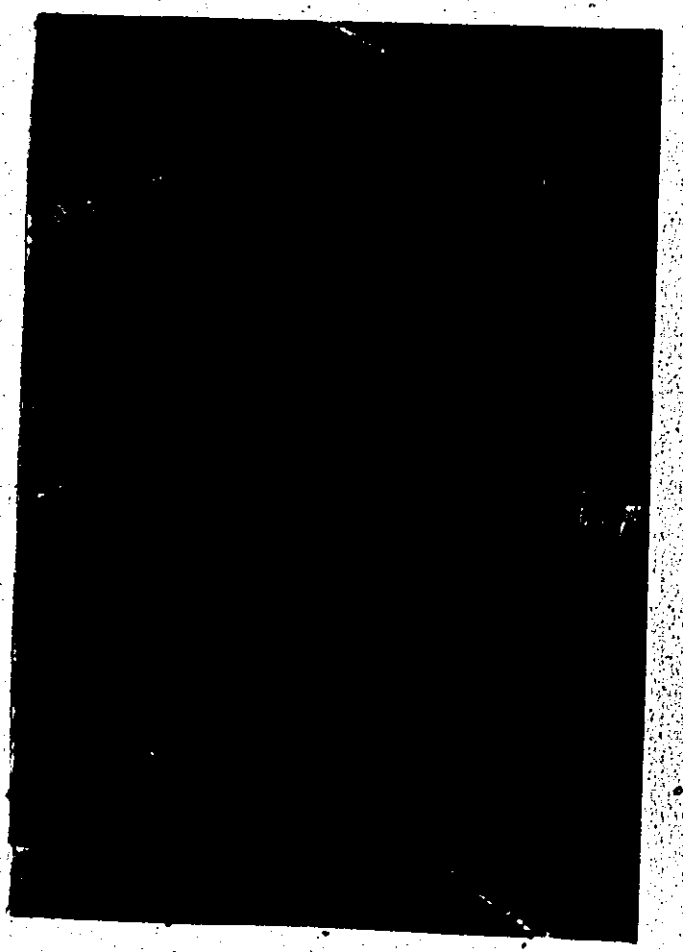
Old and Young People Scene (N)

PLATE III - Continued

Left Eye

Pair 6 People on Stage Scene (N)

Right Eye

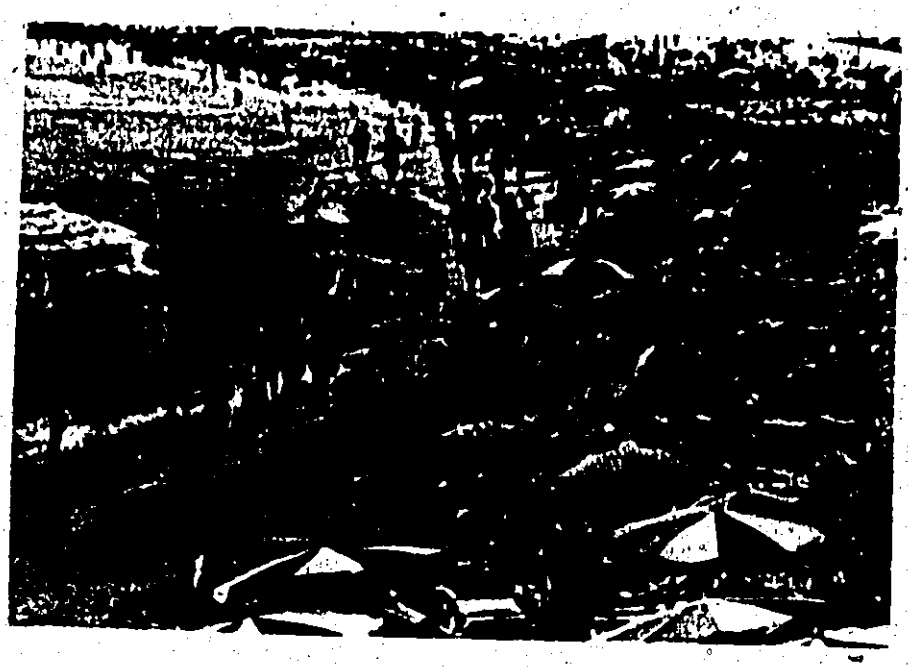


Football (S)

PLATE III - continued

Left Eye

Right Eye



Pair 7 Basketball (S)

Beach Scene (N)

Illustration 1 - continued

Pair	Left Eye	Right Eye
3.	Sports Lacrosse	Neutral Man and Woman Scene
4.	Neutral Living Room Scene	Sports Baseball
5.	Sports Hockey	Neutral Old and Young People Scene
6.	Neutral People on Stage Scene	Sports Football
7.	Sports Basketball	Neutral Beach Scene
8.	Neutral Maple Syrup Scene	Sports Track and Field
9.	Sports Curling	Neutral Sea Resort Scene
10.	Neutral Man and Woman Scene	Sports Lacrosse
11.	Sports Baseball	Neutral Living Room Scene

Illustration 1 - continued

Pair	Left Eye	Right Eye
12.	Neutral Old and Young People Scene	Sports Hockey
13.	Sports Football	Neutral People on Stage Scene
14.	Neutral Beach Scene	Sports Basketball

The score sheet for categorizing verbal responses is shown in Illustration 2. A stop watch and cardboard partition completed the instrumentalities (see PLATE II).

The dependent variable was the subject's perception of the dominant image. Sex identification class was the independent variable.

Each subject viewed the various pairs presented via the stereoscope in a predetermined sequence. PLATE III depicts the seven basic pairs. The presentation guide (Illustration 1) shows the stimuli arranged in a counter-balanced fashion for exposure to the right and left eyes. Right and left eye dominance for any specific stimulus was thus controlled. Pairs 1-8 are identical to 1-7 except that the order of presentation to the respective fields has been reversed; thus further controlling for eye dom-

Illustration 2

Score Sheet

Name	s#										Sex =				
Trials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Stimulus 1st reported															
Sports references															
Neutral references															
Definitive content description of...															
Vague content description of...															
Post-trial question "Which image was dominant?"															
Totally blocking out															

inance. This presentation format also provided a check on individual response consistency to identical pairs observed by different monocular fields. A 15th trial was given each subject, again a check for consistency. Stimulus pair 1 represented the 15th trial for subject 1; pair 2 for subject 2; pair 3 for subject 3, and so on. Constant error from the order of presentation to all subjects was controlled with a counterbalanced design. Subject 1 began the test with pair 1 and finished with 15. Subject 2 started with 2 and ended with 1; subject 3 began with pair 3 and ended with 2, and so on for all subjects according to their position in the testing order. Exposure time per trial was 15 seconds. The entire 15 trials were viewed in a discontinuous fashion as opposed to a massed distribution of trials.

Testing Procedure

One subject was received in the testing situation during trials. The subject was seated in front of the lamp. The partition prevented seeing the slides and their arrangement on the guide sheet. Each subject was briefed as a participant in a visual perception experiment designed to determine how well specific objects or situations would be recognized. Subjects were told the exposure time, and that they must give a running verbal account of what was seen.

A familiarity trial was given which employed a large black circle and a small white circle as stimuli. In this

trial the two monocular fields fused revealing a small white circle within a large black circle. The proper viewing position is shown in PLATE II. The subject used his elbows for support while holding the viewer in his hands before the light. Before placing the eyes up to the lenses, the subject closed his eyes. Each subject was reminded to keep both eyes closed until given the signal for opening them. Also it was emphasized that both eyes be kept open during the 15 second viewing exposure and that the stereoscope be removed from the eyes at the end of each exposure. On the signal the subject began viewing and relating verbally what was perceived. The stereoscope was returned to the experimenter after each trial for reloading.

Having completed the instructions and familiarity test, the experimenter checked the subject's understanding of the procedure. After this, the experiment began. The signal to begin viewing was accompanied by the start of a stop watch. Verbal statements were recorded simultaneously on the subject's score sheet. A subject's first reference to a sports scene or neutral scene was recorded with a capital S or N beside the response category "stimulus 1st reported". Each succeeding reference to specific stimuli was recorded with a check mark beside "Sports references" or "Neutral references".

When the 15 seconds expired, and the stereoscope was removed from the viewing position, the subject was asked, "Which image was dominant?" Monocular dominance

and the resolution of the rivalry situation was based upon the response to this post-trial question. An S or N was placed in the "Totally blocking out" category whenever there was no reference made to one of the two existing images in the stereoscope. After the 15 trials were completed, each subject was informed of the test's purposes and any questions were answered (Rosenberg, 1969). Subjects were asked not to relay their information to others until the week of testing had passed.

Data Processing

Verbal responses describing the stimuli perceived were quantified as frequency counts under the S (sports) and N (neutral) categories. The data provided by the study was of the nominal scale of measurement.

The hypotheses: (1) the male class will not perceive and respond to sports stimuli significantly more often than neutral stimuli and (2) the male class will not perceive and respond to sports stimuli significantly more often than the female class, were tested by non-parametric procedures. Chi square tests of significance for two independent samples were applied to response differences within classes and between classes. Chi square tests of independence were used to determine if eye dominance biased resolution and perception of the stimuli. The contingency coefficient (C) was employed for testing association between the variables of sex identification class and response. This coefficient also tested association between dominant image and first reported images perceived by subjects.

CHAPTER IV RESULTS AND DISCUSSION

Results

Descriptive statistics comparing the binocular resolutions, obtained from the dominant response category, are presented in Table 1. These frequency counts indicated that the male class saw sports stimuli 277 times as compared with the 172 perceived as dominant by females. Resolution of binocular rivalry in terms of neutral stimuli had females viewing 278 such images compared with 173 within the male class.

TABLE 1

Dominant Responses: Sports and Neutral for Male and Female Classes

Dominant Response	Class (N=30)	Raw Score	Mean	Variance	S.D.
Sports	Female	172	5.73	2.32	1.52
	Male	277	9.23	3.77	1.94
Neutral	Female	278	9.26	2.32	1.52
	Male	173	5.76	3.77	1.94

Unless eye dominance in a subject's left or right eye is controlled binocular resolution of the visual rivalry can be attributed to this phenomenon. Eye dominance was controlled by an experimental design in which both monocular fields viewed each stimulus, (elaborated in the Methodology section). A chi square technique was employed to determine if the eye dominance effect upon resolution exceeded chance expectations. The testing procedure made it possible to determine the relation of neutral-sports stimuli to right-left eyes. From each S's recorded resp-

onses, it was possible to determine to which monocular field the perceived image was exposed. Appendices A and B show the image-eye relationship for first reported and dominant images respectively. Ss were scored as either 'eye dominant' or 'non-eye dominant' according to left-right eye perception. For instance, a subject viewing 0-5 stimuli or 10-15 stimuli with either right or left eye was classified as eye dominant. Non-eye dominant Ss were those perceiving 6-9 stimuli with either monocular field. If the relationship between eye dominance and response can be shown to lack significance, then an association between responses and field dominance variables does not exceed chance. Table 2 compares eye dominant and non-eye dominant groups in a chi square test of independence.

TABLE 2

Association Between Response and Monocular Field Dominance

Class (N=30)	Eye-Dominant (Ss)	Non-Eye (Ss)	χ^2	p
First Reported Stimulus				
Male	13	17	.300	n.s.
Female	14	16	.332	n.s.
Dominant Reported Stimulus				
Male	16	14	.332	n.s.
Female	13	17	.300	n.s.

For all cases df=1

In the first reported stimulus category, there were 13 eye-dominant and 17 non-eye dominant male Ss. The resulting χ^2=.300 is not significant. Similarly, no significant differences were found within the female identification class (χ^2=.332). Both male and female classes' dominant responses may be assumed to be independent of monocular field dominance since no significant differences exist between the eye dominant and non-eye dominant groups (χ^2=.332 and .300 for males and females respectively). Given this lack of significance within each class, eye dominance cannot be a factor in the binocular resolutions reported in the present study.

TABLE 3

Distribution of Ss on First Reported Stimulus and Dominant Stimulus Responses

Category	Class (N=30)	Subject Classification N*	U*	S*	χ^2	p
1st reported stimulus	Male	2	4	24	29.60	.01
	Female	2	12	16	10.40	.01
Dominant stimulus	Male	3	8	19	13.40	.01
	Female	20	10	0	10.00	.01

For all cases df = 2; N = Neutral, U = Undecided, S = Sport

Table 3 presents the significance of intraclass response differences. According to the number of choices made Ss were classified as neutral (N), undecided (U) or sports (S). Neutral Ss were those perceiving 9-15 neutral stimuli; undecided Ss perceived 7-8 sports or neutral stimuli; and sports Ss perceived 9-15 sports stimuli. The

first reported stimulus category refers to visual images first reported by the subject upon beginning each binocular trial. In this response category there were significantly more sports Ss than in the neutral and undecided classifications. A frequency of 24 male sports Ss resulted in a significant (.01) chi square of 29.60. Similarly, the female identification class had a significant χ^2 of 10.40 between the neutral, undecided and sports classifications also significant at the .01 level. Final resolution, the dominant stimulus category, reveals that there are significantly more sports Ss within the male identification class (χ^2 = 13.40, p = <.01). Within the female class a significantly greater number of females responded to neutral stimuli (χ^2 = 10.0, p = <.01). In both response categories, males perceived sports to a significant degree. However, for females the ratio of sports Ss in the first reported category (16/2) was not evident in the dominant stimulus category where sports subjects were completely absent (20/0). Intergroup differences in binocular resolution and dominant response are presented in Table 4.

TABLE 4

Dominant Stimulus Response and Sports Distribution Between Classes

Class (N=30)	Subject Classification N	U	S	χ^2	p
Male	3	8	19		
Female	20	10	0	22.28	.01
df = 2					

The observed difference between male sports responders (19) and female sports responders (0) is significant at the .01 level. Sports responses are significant in the binocular resolution among males. Moreover, the female classes' tally of 20 neutral responders indicates that neutral stimuli are significantly more often perceived by females as dominant responses in the binocular rivalry situations. "Sports" as the dominant male response and "neutral" as the dominant female response are in accord with the experimental hypotheses.

By using a contingency coefficient (C) it was possible to establish whether or not a significant association between the variables of identification class and response existed. Subject classification according to neutral, undecided or sports response is summarized in the following table, the data of which yielded a $\chi^2 = 5.60$, significant at the .02 level. The contingency coefficient, C = .29, is a function of chi square. With chi square significant at the .02 level, the value of C is significantly greater than zero, revealing an association between one's identification class and first reported stimulus. In this category, both males and females are associated with sports responses. Table 6 presents the association between classes and the dominant stimulus response. The $\chi^2 = 22.28$ is significant at $p = < .01$. Consequently C = .52 is significantly greater than zero. The association is for the male subjects to be sports responders (19) and female subjects to be neutral responders (20) in

final resolution (perception of dominant stimuli).

TABLE 5

Contingency Coefficient Between Identification Class and First Reported Stimulus

Class (N=30)	Subject Classification N	U	S	Total	χ^2	C
Male	2	4	24	30		
Female	2	12	16	30		
Total	4	16	40	n=60	5.60	.29

df = 2, p = <.02

TABLE 6

Contingency Coefficient Between Identification Class and Dominant Stimulus Response

Class (N=30)	Subject Classification N	U	S	Total	χ^2	C
Male	3	8	19	30		
Female	20	10	0	30		
Total	23	18	19	n=60	22.28	.52

df = 2, p = <.01

The response possibilities for any given sports stimulus were 0 - 1 - 2 - 3. When the accompanying neutral image was perceived a subject scored "0". However, all Ss viewed each sports stimulus twice, thus any subject could be scored as perceiving a given sports image either once (1) or twice (2). The presence of a 15th trial made

TABLE 7

Dominant Responses for Sports Stimulus Situations

Sports Stimulus		Raw * Score	Mean	Variance	Standard Deviation
Track & Field	M	40	1.33	.621	.249
	F	16	.53	.451	.212
Curling	M	60	2.00	.266	.163
	F	49	1.63	.431	.207
Lacrosse	M	44	1.46	.382	.195
	F	26	.86	.783	.279
Baseball	M	16	.53	.649	.254
	F	9	.30	.343	.185
Hockey	M	41	1.36	.565	.237
	F	12	.40	.373	.193
Football	M	51	1.70	.409	.202
	F	36	1.20	.626	.250
Basketball	M	25	.83	.605	.245
	F	24	.80	.493	.222

M = Male Identification Class; F = Female Identification Class

* Total responses made by N = 30.

it possible for some subjects to score 3 perceptions for given sports images. Table 8 reveals how the 30 Ss from each class are distributed on the basis of their response frequency. Within the male class, 17 Ss perceived the track and field stimulus on one occasion, 7 Ss on two occasions, 3 Ss, of a possible 5 Ss, on three occasions and 3 Ss failed to perceive this sports stimulus. Seventeen female Ss did not perceive the track and field image, 10 Ss saw it once, 3 Ss saw it twice and out of a possible 5 Ss not one female perceived the sport image three times.

TABLE 8

Distribution of Ss According to Dominant Response Frequency for Sports Stimuli

Sport	Class	Response Frequency (Ss) 0	1	2	3*
Track and Field	M	3	17	7	3/5
	F	17	10	3	0/5
Curling	M	0	4	22	4/5
	F	2	8	19	1/5
Lacrosse	M	1	15	13	1/4
	F	12	12	4	2/4
Baseball	M	19	7	3	1/4
	F	23	5	2	0/4
Hockey	M	4	12	13	1/4
	F	20	8	2	0/4
Football	M	1	9	18	2/4
	F	6	13	10	1/4
Basketball	M	12	11	7	0/4
	F	11	14	5	0/4

* The numerator for each ratio signifies the number of Ss; the denominator signifies the number of Ss given a third exposure for the given sport.

By summing the number of Ss who perceive a given sports stimulus and comparing this total with the number of Ss not perceiving the same image the significance of response differences within each class can be calculated. In Table 9, 3 male subjects did not perceive track and field as compared with 27 Ss perceiving this image either once, twice or three times. With df = 1, the chi square of 17.63 is significant at the .01 level. For females, as a class, response differences for track and field are not significant. Significant intra male class responses are noticed for track and field, curling, lacrosse, hockey

TABLE 9

Intra Class Response Differences for Sports Stimuli

Sport	Class	Ss Responding		χ^2	p
		0	1+2+3		
Track & Field	M	3	27	17.63	.01
	F	17	13	.30	ns
Curling	M	0	30	14.01	.01
	F	2	28	20.83	.01
Lacrosse	M	1	29	24.30	.01
	F	12	18	.83	ns
Baseball	M	19	11	1.63	ns
	F	23	7	7.50	.01
Hockey	M	4	26	14.70	.01
	F	20	10	2.70	ns
Football	M	1	29	24.30	.01
	F	6	24	9.63	.01
Basketball	M	12	18	.83	ns
	F	11	19	1.63	ns

For all cases df = 1.

and football. Significantly more subjects perceived these sports than the number of subjects not perceiving them. Significantly more female subjects perceived curling and football, however, for the baseball image significantly more females did not perceive this stimulus. A similar response pattern appears in the male class for the baseball image but the difference is not significant.

Despite these significant intra-class differences, the data for inter class comparisons does not reveal that male response frequencies vary significantly from those of the female class. In Table 10, a significant difference

TABLE 10

Differential Class Responses to Sports Stimuli

Sport	Ss per Class Responding		χ^2	p
	M	F		
Track & Field	27	13	4.22	.05
Curling	30	28	.17	ns
Lacrosse	29	18	2.12	ns
Baseball	11	7	.50	ns
Hockey	26	10	6.25	.02
Football	29	24	.30	ns
Basketball	18	19	.00	ns

For all cases df = 1

exists for the perception of track and field and ice hockey only. Males perceived these two images significantly more often at the .05 level and .02 level respectively. Of these two, sports participation is predominantly male in ice hockey, although there is some active female participation. Female participation in track and field is well known yet males perceived this image significantly more often. There does not appear to be a pattern of males perceiving those sports exclusive to their class (football and lacrosse showed no significant differences). There are no significant differences in two sports in which both males and females participate (curling and basketball).

Stereoscopic trials began with subjects opening their eyes to view the paired stimuli. Images reported were recorded. In Table 11 association between the first

reported responses and perceptually dominant responses was analyzed. Within the male identification class the hypothesis of independence between responses for both categories can be rejected (the χ^2 = 200.63 is significant beyond $p = < .01$, thus indicating a high degree of association between these variables). This dependency, when investigated by a contingency coefficient showed a value of .55 which is significant beyond chance. For the female class, a χ^2 of 124.98 is also significant at the .01 level. Consequently, C = .46 is significant, and the association between responses for both categories is greater than that attributable to chance. These results confirm the assoc-

TABLE 11

Association Between Stimulus First Reported and Dominant Image Responses

Identification Class	Contingency Tables			χ^2	p	c
		1st Reported				
Male		Neutral	Sports			
	Neutral	122	51			
	Dominant					
	Sports	19	258	200.63	0.01	.55*
Female	Neutral	171	107			
	Dominant					
	Sports	14	158	124.98	0.01	.46*

for all cases df = 1

* significant

iation between response on the first reported stimulus category and response on the dominant category. This relationship not only indicated an alternative means for determining perceptual dominance (had any subject been unable to answer the post-trial dominance question) but also corroborates the main findings. Bagby (1957) and Engel (1956) also analyzed first perceived stimuli but did not justify its inclusion as an alternative measure of dominance.

Subjects were exposed to each stimulus pair at least twice, and in certain instances three times (the 15th trial, see Methodology). The second viewing was a reversed eye order presentation which, as discussed in the Methodology section, provided a control for eye dominance. It also permitted an analysis of subject response consistency to identical items presented to the right and left monocular fields. The relationship between the first viewing responses (for items 1, 2, 3, 4, 5, 6, 7, -) and those of the second viewing (8, 9, 10, 11, 12, 13, 14 15) was investigated and is presented in Table 12. Since each item pair was physically identical, (1/8, 2/9, 3/10, etc.) a subject was scored as consistent if he or she responded N/N or S/S. Similarly, an inconsistent subject responded either N/S or S/N on the stimulus pair. Male subjects were consistent significantly more often on items 2/9 and -/15 (curling and the response consistency trial respectively). Female subjects were consistent significantly more often for items 2/9, 4/11, 5/12, and -/15 (curling,

TABLE 12

Subject Response Consistency on Identical Stimulus Item Pairs

Male Class Pair	Consistent Ss	Inconsistent Ss	x^2	p
1/8	12	18	.83	ns
2/9	27	3	17.63	.01
3/10	14	16	.33	ns
4/11	20	10	2.70	ns
5/12	16	14	.33	ns
6/13	20	10	2.70	ns
7/14	17	13	.30	ns
-/15	23	7	7.50	.01
Female Class				
1/8	20	10	2.70	ns
2/9	21	9	4.03	.05
3/10	18	12	.83	ns
4/11	24	6	9.63	.01
5/12	21	9	4.03	.01
6/13	14	16	.33	ns
7/14	16	14	.33	ns
-/15	23	7	7.50	.01

For all cases df = 1.

baseball, hockey and the response consistency trial respectively).

For some subjects, predominance of a particular sports or neutral image manifested itself in such a way as to block out the other paired stimulus presented. For

instance, male subjects who perceived sports as dominant, made no mention of the accompanying neutral stimulus on 13 occasions. Sports stimuli were blocked out by males 9 times when neutral images were dominant. Females blocked out 9 neutral and 6 sports stimuli when sports and neutral respectively were dominant.

TABLE 13

Determination of Neutral Stimuli

Image	Response		
	Masculine	Neutral	Feminine
Water Fountain*	0	4	4
Beach Scene	2	4	2
Maple Syrup Time	3	4	1
Old & Young People	0	5	3
Car on Highway*	3	5	0
People on Stage	1	5	2
Sea Resort	0	6	2
Man and Woman	2	5	1
People Viewing Skyline*	0	4	4
Skiers & Ski Lift*	3	4	1
Living Room Scene	1	5	2

*Excluded on basis of content

The neutral stimuli used in the experiment derived from the judgments of neutral content made by a panel of eight male and female judges. A total of 47 potentially neutral images were presented to the panel. Table 11

shows those images that received the best scores of neutrality. The maximum value of 8 was not obtained by any image. The nature of the binocular rivalry experiment necessitated equating physical qualities of neutral stimuli with those of sports stimuli. Thus, from the above eleven neutral images, four were eliminated because of certain physical properties which might have influenced perceptual dominance. The remaining seven neutral images were matched with specific sports stimuli (see Methodology, PLATE III).

Discussion

Results confirmed the research hypotheses. In the binocular rivalry situation, the male identification class perceived sports stimuli significantly more often than they perceived neutral stimuli. As predicted, males perceived sports stimuli significantly more often than did the female class. Variance in results due to eye dominance was shown to be absent, enabling the hypothesis of independence between eye dominance and response to be accepted. In other words, the tendency for one of the S's two monocular fields to exert visual dominance did not contribute significantly to perceptual resolution and dominance of images. Other variables, such as mood and set, probably contributed to selections of image dominance. The contingency coefficient, based upon a significant chi square ($p = <.01$), confirmed that a respondent's identification class and his/her resolution and perception of dominant responses were associated. Sports, as a dominant

image, is associated with the male identification class; neutral image dominance with the female identification class.

Within the male class, significantly more subjects perceived track and field, curling, lacrosse, hockey and football. Significantly more females perceived curling and football, and significantly more females did not perceive baseball within their class (Table 9). Males perceived track and field and ice hockey significantly more often than did females (Table 10). Of the two, only the latter is a male-dominated sport. No significant differences between classes were found for lacrosse, baseball or football, all of which have predominantly male participation. Activities such as curling and basketball, which both sexes actively enjoy in Canadian culture showed no significant dominant response differences. Despite active participation by females in track and field, males perceived this sport significantly more often ($p = <.05$). The results from diverse sports must be analyzed separately in the light of both active and passive involvement. The postulate that males perceive those activities which are regarded male orientated and dominated in Canadian culture was confirmed for ice hockey, but not for lacrosse, baseball or football. It is possible that response scores for baseball indicated an imbalance in stimuli physical properties favoring the neutral stimulus. Also, low scores may be an outcome of an unfavorable psychological disposition toward baseball. Females tend to be involved in

football only as passive consumers or spectators. Football's significance on university campuses, notably its social flavor, may be a contributing factor in female awareness and perception of this sport. Although not an entirely male pursuit, track athletics was perceived as dominant significantly more often by male respondents. Strenuous physical training, keen competition and an emphasis on individual achievement are associated qualities which diverge from contemporary female values. Sutton-Smith and Roberts (1962, 1970) have associated males with physical skill and achievement type activities. It would appear that the female experimental class perceived less of the track and field stimulus because of its masculine related qualities. The track and field stimulus lacked relevant feminine appeal.

Transactional functionalism interprets perception according to the familiarity, significance and meaning of cues (Kilpatrick, 1961). Significant stimuli are readily perceived in stimulus ambiguity situations. Both Bagby (1957) and Engel (1956) established how such meaningful cues determined the dominant responses during binocular rivalry. In this study, sports content served as meaningful, familiar cues for members of the male identification class. Males perceived sports as dominant because, consciously or unconsciously, significances of past experiences related to sports were aroused. As a dominant response, sports resulted from subject ego-involvement. It can be

inferred from the female class' neutral responses that sports did not generate this same ego-involvement. Relevant meaning and familiarity were not sufficient to produce a significant sports response. Instead, neutral stimuli were dominant because contents contained significant perceptual cues.

Contributing to this attachment of significance to sports cues is the socialization process. As an experience regulating process, socialization readily complies to the transactional model. Sex-typing, socialization based on one's sex, channels male and female socio-psychological development along appropriate masculine and feminine ideals. Sports involvement has been interpreted as a product of socialization (Kenyon and McPherson, 1970) and as an agency for socialization (Helanko, 1957). Sports participation is learned in social situations. Individuals are acquainted with sundry sports from hearing about them, watching them, reading sports material and actively participating. When coupled with the social situation, created as a consequence of unavoidable interaction, people form attitudes about sports. Whether these attitudes accept, reject, or are non-committal determines a person's sports ego-involvement. An examination of the social learning theories (Goslin, 1969) is useful in understanding the socialization process in a sports context.

The societal model of structural-functionalism (Parsons, 1951; Merton, 1957) assists in analyzing the results. Sports' functions within society have been

demonstrated and discussed by Luschen (1967), Sutton-Smith and Roberts (1962, 1970), Dunlap (1951), Helanko (1957) and Allardt (1970). Within the context of this study, the function of sports is best understood in terms of behavioral roles for males and females. Based upon cultural tradition, society defines roles describing behavioral expectations. Appropriate behavior is rewarded; inappropriate behavior is not. Masculinity is a characteristic expectation for males as is femininity for females. Socialization produces a certain degree of conformity in habits, values and personalities deemed essential to perpetuating culture. Behavior becomes selective and predictable. When sports in a given culture are defined and outlined by males, then society's conception of sports becomes male orientated and biased. Female sports, as a female subcultural entity, are non-existent; they are still male sports. Similarly, in the case of defining what an athlete is, society has a male orientated definition of the term athlete. The end product of this is the sterotype of female athletes possessing masculine qualities but lacking appropriate feminine attributes.

Findings by Sutton-Smith and Rosenberg (1963), Terman and Miles (1936), Porter (1967), Moss and Kagan (1961) and Clark and Lantis (1958) confirmed the association between sports and masculinity. Sports was a means of appropriate male behavior. Female sports participatants were described as masculine, an inappropriate behavioral pattern contrary to cultural demands. As a socialization

agent, sports acquire functional significance for the male identification class. Logically, this significance should be reflected in a greater sports involvement by males. Studies by Andersen et al (1956), Wonneberger (1968), Sutton-Smith et al (1963) have supported this. In addition, athletic participation was a source of status and satisfaction (Coleman, 1960, 1963; Helanko, 1957; Robinson, 1967). Within the female identification class, both active and passive participation were found to be lower. As a value, sports was rated low. Cultural stereotypes of femininity have predisposed female participation, especially active, to sex-inappropriate behavior (Moss and Kagan, 1961; Clark and Lantis, 1958; Ulrich, 1960). This produces avoidance behavior, based upon attitudes of rejection or noncommitment. Women, as well as men, have learned to be selective in their behavior. Sports is rewarding for males qua males; not for females qua females. Males incorporate the sports norm whereas females select other, more appropriate to female culture values.

Mussen's (1969) observation that early childhood experiences are crucial for appropriate sex-role development is applicable to the sports situation. Existing sports structures in Canada accommodate young boys at the starting levels of minor leagues. For males then, sports participation and socialization can, and most often does, begin very early. The established sports pattern among males no doubt has its roots implanted during this early period of boyhood. Socialization of young boys into

sanctioned masculine patterns is provided. Female behavioral patterns also evolve at this early stage, but without an elaborate sports participation structure for girls, and acceptable to them, one cannot expect a female athletic role to emerge. Rather, as noted by Mussen, conformity to feminine stereotypes becomes the resulting pattern. Thus, it is possible to trace origins of male ego-involvement in sports to early sex-typing activities (sports). The arousal of interest in and formation of positive attitudes towards sports within the female identification class would be possible if appropriate sports structures existed to permit early and continuous female participation in desirable activities. The status of female athletes and sports would be elevated if new concepts of 'female athlete' and 'female sports' were formulated to coincide with positive female values. Using masculine criteria to conceptualize female athletes and female sports cannot be justified considering those misconceptions this practice has given rise to.

Nevertheless, the fact remains that the athletic realm and societal demands for males are complementary. For females these are incongruous, thus producing differential sports behavior between sex classes. Males choose sports; females avoid sports. These sub-cultural variations in behavioral selectivity, fostered by socialization, extend to the perception of sports cues in the environment. Within the theoretical model, socialization builds up "assumptions" associated with past experiences from

sports. Both males and females formulate such assumptions. Among males, sports and its various cues have acquired meaningful content. This has been established by recent studies (Robinson, 1967; Coleman, 1960, 1963; Porter, 1967; Ulrich, 1960) which demonstrated that, among other things, sports is a means for actualizing masculinity. The female class' assumptions about sports are negative. In accord with the predicted low importance attached to sports by contemporary, female socialization the expected dominance of neutral stimuli was confirmed. The significance of sports within the male identification class was demonstrated by this class' perception of the sports stimuli.

Research into the appropriateness-inappropriateness of sports for females in light of recent social chances (i.e. women's liberation) would be interesting. Perhaps the flexibility in role behavior permitted for young girls (Rosenberg and Sutton-Smith, 1960; Lynn, 1959; Schell and Silker, 1968) has been extended to young women. Perhaps, as reported by Nigg and Heiderich (1968), a lag between social changes in concepts of femininity and the incorporation of these into responses such as sports would be found. Present results indicated that, given a perceptual choice, selectivity determined a significant preference for non-sports material (Table 6). Yet, individual differences (female sports responders) were found (Table 9).

Although not recorded, verbal communications relating subject perceptions were strikingly different between

identification classes. Male subjects described sports images more accurately and in greater detail; they correctly identified sports activities without difficulty. Action sequences depicted in various sports slides, plus equipment and facilities were perceived and described. In general, females did not do this. Often a specific activity was perceived but not properly named. Sports knowledge, educed from stimulus cues, appeared diffuse. Sports jargon was missing. Despite individual differences, these observations have interpretive significance. Language, as a social product, is related to vital group activities. Specific events, objects, or situations valuable in the life of people receive more elaborate conceptualization (Malinowski, 1930). Tannenbaum and Noah (1959) found that sports consumers (principally males) were able to comprehend sports page messages while non-consumers (mostly females) extracted little information from terms used experimentally. Verbal communications of sports stimuli reflected interests and values of the two classes in this study. Accurate, detailed reports from males furnished supplementary evidence of sports' significance. The lack of significance connected with sports is mirrored in the female subjects' description of perceived sports images. Further, more systematic research is necessary before significant conclusions can be formulated.

Caution is necessary in interpreting class norms, inferred from dominant responses, as objective measures of attitudes towards sports. Single scores employed were

not adequate measures of attitudes (Cook and Selltiz, 1964). Degrees of acceptance, rejection or noncommitment cannot be inferred from single scores of perceptual dominance. Male subjects were ego-involved with sports content, but their degree of involvement could not be inferred. The inference that the male class' sports norm, reflected in sports responses, indicated a favorable attitude is possible but procedural changes are required for examining attitude strengths. This would maximize interpretive significance. A follow-up questionnaire on attitudes as a part of an extension of the present study is a potentiality. With refinement the binocular rivalry stereoscope can contribute valuable data on attitude and learned response measurement. Binocular rivalry presents a disguised situation and thus eliminates responses felt to be desirable by the subject. Its indirect method is valuable in attitude assessment. Responses to the stimulus-ambiguity situation are both spontaneous and undistorted. Internal factors, significant in psychological patterning, are best revealed through such techniques (Sherif and Sherif, 1969).

In sum, results verified the hypothesis that the male identification class resolves binocular rivalry by perceiving sports images as dominant. In this stimulus-ambiguity situation, females perceived non-sports stimuli significantly more often. These predicted and confirmed propositions derived from the transactional functionalism model of perceptual activity. Sports' functional values,

particularly male socialization for masculine roles, was considered. The socialization aspect, was evaluated in relation to the structural-functional model of society. Male and female involvement in sports, particularly the latter, has been a neglected research area. Knowledge from this special problem is basic to understanding sports as a means of learned behavior.

CHAPTER V SUMMARY AND CONCLUSIONS

Summary

Various studies, primarily concentrating on the quantity and type of sports participation, have confirmed the postulate that sports involvement is male dominated (Sutton-Smith, Roberts and Kozelka, 1963; Andersen and others, 1956; Wonneberger, 1968). The differential values males and females attached to sports further substantiate this discrepancy in involvement (Heřanko, 1957; Nigg and Heřderich, 1968; Robinson, 1967; Coleman, 1960, 1963). In terms of active and passive participation, male rates were higher than those of females. Research on values found that sports was a significant aspect of male sub-cultural life. Such was not true for females.

In Canadian society there is a paucity of research into this area of male-female involvement in sports, and cross-cultural inferences from other studies are severely restricted. Through application of participation-value study results, the main research hypothesis of this present study was formulated: A subject's identification class will determine perception and resolution of certain sports stimuli in a binocular rivalry situation. Male and female perceptual selectivity, with sports scenes serving as stimulus cues, was tested. Each male and female identification class was represented by thirty volunteer subjects. Physical education students were not available as subjects. Exclusion of a female physical educator sub-class was particularly important since little knowledge of this group's identifications was available. Their degree of involvement with sports makes them a separate female sub-

culture. This is not to say that female physical educators or athletes are masculine, but rather, that their attitudes towards sports may approximate those of the male identification class and not the female identification class.

Seven sports images (track and field, curling, lacrosse, baseball, ice hockey, football and basketball) were paired with seven neutral stimuli. Neutrality was previously determined by judges. Each stimulus pair was viewed through a stereoscope inducing a binocular (retinal) rivalry situation. A modified "View-Master" served as the stereoscope. Eye dominance was controlled by the order of stimuli presentation to the right and left eyes and a repeated-trials presentation. Verbal reports by subjects indicated binocular resolution and stimulus dominance for each stimulus pair. These perceptual choices were registered as scores for each subject.

Perceptual selectivity functioned in determining sports or neutral stimulus dominance. Results were interpreted from principles of transactional functionalism. Significant past experiences, in this case sports experiences, as fundamental in the perception of objects, events and situations, is a basic proposition of this theoretical model. Socialization and structural-functionalism (Parsons, 1951, 1960) were assessed in light of the results and sex-class experiences with sports. Analysis of results indicated that the male identification class perceived sports stimuli in an either/or choice situation significantly more frequently than did the female class.

This outcome was attributed to male familiarity with sport in contemporary Canadian culture and the relative meaning content of sports for the male class. The inference that sports images lacked significant, meaning content for the female class was based upon the significant frequency of neutral stimulus perception by the female sample.

Conclusions

Conclusions based upon data analysis and interpretation are as follows:

1. In the binocular rivalry situation, the male identification class resolved rivalry and perceived sports images significantly more often than neutral stimuli, and significantly more often than did the female class. This confirmed the stated hypotheses formulated from previous research on rates of participation and specific values attached to sports. Helanko's study (1957) established sport's function as an agency for the socialization of males. Through participation, especially active, cultural norms designating male behavior patterns emerge and become incorporated into the male repertory. In this sense then, sports structures assist in the typing of male individuals according to societal roles and accompanying role expectations. Conscious or unconscious efforts to promote male sex-appropriate behavior via sports results in sports being a product of socialization. By contributing to status (Coleman, 1960), developmental needs (Porter, 1967) and achievement potentialities (Parsons, 1942;

Sutton-Smith and Roberts, 1970; Sutton-Smith, Roberts and Kozelka, 1963), sports become highly valued in the male value hierarchy (Robinson, 1967). The perception of sports images in a stimulus overload situation providing perceptual choice is a confirmation of male ego-involvement (Sherif and Sherif, 1969) with the sports subculture. Varied past experiences in active and/or passive involvements have persisted in terms of socio-psychological significances. These are the transactional "assumptions" governing perception. As societal structures, sports are means for male actualization of societal expectations. Society utilizes sports as a socializing agent; however, sports and attitudes about sports are important products generated by the socialization of male members in society.

2. Neutral stimuli as perceptually dominant were chosen significantly more often by the female identification class. The associated meaning of sports content for the female was not sufficient to produce perceptual selectivity of sports images. This was hypothesized in view of the dysfunctional significance and failure of sports in meeting female role expectations; for females, sports has been described as inappropriate behavior (Parsons, 1942; Moss and Kagan, 1961; Ulrich, 1960). Sports has not been highly valued among females (Robinson, 1967) and rates of participation are accordingly lower. Consequently, "assumptions" favoring perception of sports images were absent and the alter-

native stimuli were perceived.

3. Variables of dominant response and identification class were significantly associated: a contingency coefficient of .52 was significant at the 0.01 level. Sports responses and the male identification class were significantly related as were neutral responses and the female identification class.

4. The active involvement in a sport by males only was not the sole determinant of a sport's perceptual dominance for subjects (see Tables 9 and 10). Several females also perceived male dominated activities such as lacrosse, ice hockey and football despite the scarcity of active female involvement. Determination of resolution and perceptual dominance also involved meaning content attached to sports through various forms of passive consumption.

5. Association between perceived stimuli in the first-reported stimulus category and dominant image category was statistically significant (see Table 11). For the male class the contingency coefficient was .55, and C was .46 for the female class (for both $p = < 0.01$). This relationship between what one perceives initially and eventually as the dominant stimulus can be applied as a method for checking image dominance.

6. A tentative conclusion is the association between perception of sports images as dominant and sports language acquisition within the male identification class. The significance of the association might be estab-

lished by means of properly recording and quantifying verbal content.

Recommendations

The modified stereoscope was suitable as an instrument. However, the principles of the "View-Master", plus modifications, should be considered in constructing a larger apparatus. Having the stereoscope mounted on a stand and containing an internal light for illuminating images are recommended. Compared with other stereoscopes (Engel, 1956; Bagby, 1957) the present apparatus was simple in construction and the task of focusing images for every subject was eliminated.

Data on identification class and attitudes toward sports would be supplemented by post-test interviews and attitude questionnaires. From this information inferences about positive-neutral-negative attitudes and the degree of ego-involvement can be made. Data for investigating the variable of sports language can be gathered by tape recording a subject's verbal reports of perceived images.

For some subjects the viewing exposure time per trial was too long (15 seconds). These subjects demonstrated difficulty in verbalizing perceptions during the length of the exposure. Silence predominated during the latter part of the exposure. The risk of this is that subjects may begin looking for things to perceive and thus perception may not be spontaneous, but rather, systemmatic and deliberate. The exposure time, adequate for some, too

long for others, should be investigated by experimental manipulation.

Due to the unavailability of female physical educators, this subclass' perceptions were not investigated. One would hypothesize that, because of sport's importance for these subjects, female physical educators will tend to perceive sports stimuli as dominant. Sports is significant assuming that these females choose physical education because of positive attitudes towards this pursuit. Sports dominance would be expected within the present theoretical framework. Perceptions of dominance for female physical educators and athletes should be investigated.

There remains the question to what extent the experimental method was reliable. Results from Table 12, particularly within the male class, indicated that males were not consistent in their responses. Responses to the first viewing (items 1, 2, 3, 4, 5, 6, 7, -) and to the second viewing (8, 9, 10, 11, 12, 13, 14, 15) lacked the consistency expected of such repeated exposures. The second viewing was not independent from the first and considering the close temporal arrangement between exposures, the second viewing was undoubtedly affected by the first, thus producing a measure of variation. A proper evaluation of reliability is necessary for the binocular rivalry method.

APPENDICES

APPENDIX A

Response Distribution for First Reported Stimuli

Subjects	Right Eye				Left Eye			
	Neutral		Sports		Neutral		Sports	
	M	F	M	F	M	F	M	F
S1	4	4	2	5	3	2	6	4
S2	1	3	6	7	2	1	6	4
S3	4	0	1	1	6	6	4	8
S4	0	1	1	3	7	5	7	6
S5	2	2	5	3	2	4	6	6
S6	1	2	5	6	3	2	6	5
S7	5	3	5	4	2	3	3	5
S8	1	4	6	4	1	4	7	3
S9	2	3	6	4	1	3	6	5
S10	4	1	6	4	2	4	3	6
S11	3	4	6	7	0	0	6	4
S12	2	3	8	4	0	4	5	4
S13	3	3	6	3	1	4	5	5
S14	3	3	4	4	4	4	4	4
S15	1	1	5	5	2	2	7	7
S16	2	6	7	8	1	0	5	1
S17	0	4	1	4	6	3	8	4
S18	1	5	6	3	2	5	6	2
S19	2	3	4	2	3	5	6	5
S20	1	1	7	3	1	5	6	6
S21	5	0	7	6	0	1	3	8
S22	3	3	6	3	3	5	3	4
S23	1	4	7	5	0	2	7	4
S24	0	2	5	2	3	6	7	5
S25	5	4	6	4	1	3	3	4
S26	4	4	6	5	2	3	3	3
S27	0	6	3	4	4	3	8	2
S28	1	6	1	7	7	1	6	1
S29	2	0	6	4	1	3	6	8
S30	3	1	5	2	3	6	4	6
Total	66	86	149	126	73	99	162	139

M = Male; F = Female

APPENDIX B

Response Distribution for Dominant Stimuli

Subjects	Right Eye				Left Eye			
	Neutral		Sports		Neutral		Sports	
	M	F	M	F	M	F	M	F
S1	6	4	2	4	5	3	2	4
S2	3	6	4	1	4	7	4	1
S3	4	3	2	3	5	4	4	5
S4	0	1	3	2	5	6	7	6
S5	2	3	5	2	2	5	6	5
S6	1	5	5	4	3	4	6	2
S7	5	5	5	4	2	3	3	3
S8	1	4	4	3	3	5	7	3
S9	3	4	4	2	3	5	5	4
S10	3	3	7	3	1	5	4	4
S11	4	4	4	3	4	4	4	4
S12	5	5	7	3	1	5	2	2
S13	6	5	4	2	3	5	2	3
S14	2	3	5	2	3	6	5	4
S15	2	5	3	2	4	5	6	3
S16	2	6	7	6	1	2	5	1
S17	0	6	1	4	6	3	8	2
S18	1	6	6	1	2	7	6	1
S19	2	4	3	1	4	6	6	4
S20	4	3	7	3	1	5	3	4
S21	6	4	6	3	1	4	2	4
S22	5	3	6	0	2	8	2	4
S23	1	6	6	3	1	4	7	2
S24	0	4	3	1	5	7	7	3
S25	6	7	6	3	1	4	2	1
S26	3	4	5	3	3	5	4	3
S27	2	6	2	4	5	3	6	2
S28	1	7	2	6	6	2	6	0
S29	2	3	6	1	1	6	6	5
S30	2	4	5	1	2	7	5	3
Total	84	133	135	80	89	145	142	92

M = Male; F = Female

APPENDIX C

Sources for Visual Stimuli

Canadian Magazine, July 11, p. 14, 1970 (Old and Young People Scene).

Globe and Mail, July 11, p. 27, 1970 (Sea Resort Scene).

Ibid., July 17, p. 11, 1970 (People on Stage Scene).

Margriet, 9, March 1, 1969 (p. 111, Man and Woman Scene; p. 19, Living Room Scene; p. 88, Beach Scene).

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Sports Canada, Feb. p. 9, 1970 (Hockey).

Sports Illustrated, Dec. 15, p. 55, 1969 (Baseball, Basketball).

Ibid., Dec. 22, p. 70, 1969 (Football).

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