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The Social Correlates of Type A Behavior in Children

by

Francine T. Chappus

,sertation presented to the School of Graduate Studies of the
..iversity of Ottawa in partial fulfillment of the requirements
for the degree of Doctor of Philosophy.

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This thesis is dedicated to the memory of my parents. Although they were unable to share with me the completion of this manuscript, my memory of their faith and belief in me was inspirational. An education is important in one's quest for independence. Also, it's just plain interesting!

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Abstract

The purpose of the present study was to investigate whether children classified as Type A and Type B differed on a number of measures of social functioning. A total of 176 children from grades 4 and 6 participated in the study. The entire sample of children was asked to fill out the Hunter-Wolf A/B Rating Scale, a self-report measure of Type A behavior, and the Children's Social Support Scale, a self-report measure of the availability of social support from significant others and of the quality of available support. The Pupil Evaluation Inventory, which provides peer nominations of Aggression, Withdrawal, and Likeability, was also administered. A subsample of 50 children were observed during free play at recess. Results indicated that children classified as Type A were evaluated by their peers as higher on aggression than their Type B counterparts. There was no significant difference between the two groups on peer-rated likeability or withdrawal. Type A children also indicated that the quality of their available social support was significantly poorer than that reported by Type B children. While Type A children's social support did not differ as a function of grade level, Type B children in grade 6 reported significantly more social support than Type B children in grade 4 or Type A

children in grade 6. Females reported significantly more social support available to them than did males, and males received higher scores on aggression. While Type A children in grades 4 and 6 did not differ in the amount of low-involvement watching behavior engaged in, Type B children in grade 4 displayed significantly more watching behavior than Type As at the same grade level or than Type B children in grade 6. Implications of the results were discussed with reference to the social consequences of Type A behavior and suggestions for future research were noted.

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Social Correlates of Type A Behavior in Children

Cardiovascular disease is considered Canada's number one killer, with approximately 27,000 deaths per year attributed to heart attacks and 38,000 deaths to other cardiovascular conditions (Statistics Canada, 1989). In the United States cardiovascular disease accounts for one third of all deaths (Booth-Kewley & Friedman, 1987), while millions of other individuals suffer from heart disease, facing disability or, at best, lengthy and costly rehabilitation. Given the prevalence and seriousness of this disease, the specification of causal factors would seem the most feasible research direction to promote prevention. Past studies of traditional risk factors have included age, sex, cholesterol levels, high blood pressure (hypertension), cigarette smoking, obesity, diabetes, lack of exercise, and family history of heart disease (Glass, 1977). However, "the best combinations of standard risk factors fail to identify most new cases of heart disease" (Jenkins, 1971a). In fact, these standard risk variables account for less than 50

percent of coronary heart disease (CHD) in middle-aged men (Price, 1982). Consequently, researchers acknowledged the need to expand the search for additional factors that may contribute to the etiology of CHD. This resulted in the identification of a promising factor, the Type A behavior pattern, which was believed to be implicated in the pathogenesis of atherosclerosis and the onset of clinical coronary heart disease (Glass, 1977).

What is the Type A Behavior Pattern?

The Type A behavior pattern was first conceptualized by Friedman and Rosenman (1974) who, in recognizing the limited predictive power of traditional risk factors, studied their coronary patients for communalities that could account for their condition. They noticed a distinctive response style among coronary patients exemplified by

> "a characteristic action-emotion complex which is exhibited by those individuals who are engaged in a relatively chronic struggle to obtain an unlimited number of poorly defined things from their environment in the shortest period of time and, if necessary against the opposing effects of other things or persons in the same

environment (Friedman & Rosenman, 1974, pg.84)." Rosenman (1978) described the Type A behavior pattern in terms of impatience and a chronic sense of time urgency, enhanced competitiveness, aggressive drive, and often some hostility. On the other hand, the behavior pattern referred to as Type B was said to be exemplified by relatively little or a nonhabitual sense of time urgency, noncompetitiveness, a lack of aggressive drive, and a generally more relaxed, easy-going, and patient individual (Rosenman, 1978).

Association between Type A and Coronary Heart Disease

Evidence for the validity of Type A as a factor which contributes to vulnerability for cardiovascular disorders has come from both concurrent validation studies and prospective-longitudinal studies. Jenkins, Zyzanski, and Rosenman (1971) found that coronary patients scored significantly higher on a measure of Type A behavior, the Jenkins Activity Survey (JAS), than did a control sample free from this disease. These findings were buttressed by the results of a study conducted by Kenigsberg, Zyzanski, Jenkins, Wardwell,

and Licciardello (1974) which indicated that coronary heart disease patients obtained significantly higher Type A scores than did patients hospitalized for other diseases. Autopsy and angiographic findings indicated that Type A scores were correlated with the extent of coronary artery disease (Williams, Haney, Lee, Kong, Blumenthal, & Whalen, 1980). However, the strongest evidence of a relationship between Type A and CHD would involve the demonstration of a prospective association between the Type A behavior pattern and subsequent increased risk of CHD events. The findings from relevant prospective studies appear to be equivocal, and thus will be discussed in more detail.

Existing prospective studies can be categorized into population-based studies and studies of high-risk subjects. Generally, population-based studies have provided support for the validity of the Type A behavior pattern as a risk factor for CHD. Two landmark studies, the Western Collaborative Group Study (Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975) and the Framingham Heart Study (Haynes, Feinleib, & Kannel, 1980), established the Type A behavior

pattern as an independent risk factor for coronary disease, with those who exhibited the pattern having approximately twice the rate of coronary heart disease compared to Type B non-coronary prone individuals even after traditional risk factors on which the two types differ (serum cholesterol, hypertension, and cigarette smoking) were statistically controlled. The association between Type A behavior and CHD was most marked when levels of other risk factors were elevated. Further analyses of the 10-year incidence data from the Framingham Study (Haynes & Feinleib, 1982) showed comparable findings both in white collar men and in women.

Two further prospective, population-based studies (French-Belgian Collaborative Group Study, 1982; Belgian Heart Disease Prevention Trial - DeBacker, Kornitzer, Kittel & Dramaix, 1983) also found Type A behavior to be predictive of CHD. However, contrary to the findings of the previously-described prospective population-based studies, Blackfield and Reed (1985) reported no association between CHD incidence and Type A behavior in subjects of Japanese ancestry living in

Hawaii. Possible explanations for this lack of support include social-cultural factors and the lower incidence of coronary heart disease and prevalence of Type A behavior in this particular group: the incidence of CHD in these subjects was found to be approximately 50% that of the incidence for white Americans in the Framingham Heart Study, while the prevalence of Type A behavior was only 20% as opposed to the 50% found in the WCGS, suggesting that this is a very low risk group in which Type A behavior may not constitute a risk factor (Matthews and Haynes, 1986). Given the value of cooperation in Japanese culture and the low scores on the competitiveness dimension of the JAS in the Honolulu Study, these low incidence and prevalence rates are not surprising. Furthermore, as Matthews (1982) notes, working hard or quickly under cooperative and supportive conditions does not have the same cardiovascular response effects as the same level of activity performed alone or competitively.

Currently, reports of six prospective studies of high risk subjects are available in the literature. Five of these investigated the predictive ability of

Type A status for new coronary events, and one study looked at the relationship between Type A and CHD in subjects at high risk (defined by elevated levels of traditional risk factors). Jenkins, Zyzanski, and Rosenman (1976) studied a subsample of 267 men from the WCGS to determine the power of the JAS to predict recurrence of coronary heart disease. The first event had occurred prior to or during the course of the WCGS, and these men were followed at least until the seventh year of the study. The global Type A score distinguished between men with a single CHD event and those who experienced a recurrent event.

Dimsdale, Gilbert, Hutter, Hacket, and Block (1981) employed the JAS as a predictor of hospitalization for cardiac problems, myocardial infarction, resuscitation, and death in 189 men who had undergone coronary angiography due to symptoms of coronary artery disease. The follow-up period was one year in length. Surprisingly, results indicated that Type B status was more predictive of new cardiac events. These results should be considered in light of the findings that only 15% of the subjects were free of

coronary artery disease (CAD) at the onset of the study and that 40% were surgically treated for CHD during the follow-up period. Both the high initial rate of CAD and the large number of surgical interventions could alter the relationship between risk factors and developing morbidity (Dimsdale et al., 1981), especially given the short length of follow-up. In addition, traditional risk factors (age, blood pressure, and number of diseased vessels) found to be related to CHD in other studies were not found to be significant predictors in this study, suggesting that it was an anomaly in many ways.

In the Multicenter Post-Infarction Program (Case, Heller, Case, & Moss, 1985) a subsample of 516 men were followed for 1 to 3 years to determine the independent risk factors that influenced survival following myocardial infarction. One of the factors studied was Type A status as assessed by the JAS. Results indicated no predictive association between Type A and subsequent mortality. Some methodological issues relevant to this study should be noted. Comparisons of those who participated in this study and 350 men who did not

revealed that nonparticipants had more severe cardiac disease and higher mortality rates (2 times greater) during follow-up than did participants (Friedman, 1988), suggesting that this may have been a biased sample. In addition, 30% of subjects were recipients of beta-blocker therapy which could have interfered with the expression of Type A behavior (Case et al., 1985).

Shekelle, Gale, and Norusis (1985) also failed to find an association between JAS-assessed Type A behavior and recurrent myocardial infarction in 244 females and 2,070 males participating in the 3 year Aspirin Myocardial Infarction Study. The Multiple Risk Factor Intervention Trial Study (Shekelle, Hulley, Neaton, Billings, Borhani, Gerace, Jacobs, Lasser, Mittlemark, & Stamler, 1985) defined subjects at risk in a different way from studies previously described. The sample of 3,110 men, initially heart disease free, had elevated levels of cigarette smoking, serum cholesterol, and diastolic blood pressure (placing them in the upper 10% of the distribution for risk of CHD) and had volunteered to participate in a clinical trial aimed at reducing these factors. Subjects were randomly

assigned to either a special intervention group or a usual-care group. The special intervention entailed treatment for hypertension, counselling to stop smoking, and dietary advice to reduce cholesterol levels. The usual-care group was referred to usual sources of health care in the community. All subjects completed the JAS; 25% of the sample completed the Structured Interview (SI), a measure using behavior observed during a standard interview rather than self-report as a basis for classification. There was no relationship found between Type A behavior, as assessed by either the JAS or the SI, and coronary death after an average of seven years of follow-up. These findings are difficult to interpret in light of the fact that 74% of the subjects assessed with the SI were classified as Type A. Criqui (1979) has indicated that overrepresentation of a risk factor such as Type A behavior influences the validity of relative risk estimates when disease rates in the study group are also unrepresentative of the target population. The ability of this study to detect an association between Type A behavior and coronary disease may thus have been

weakened by the unrepresentative preponderance of Type A individuals and of individuals at high risk due to elevated levels of traditional risk factors. Indeed, the researchers in the MRFIT Group pointed out that it would be unwarranted to conclude on the basis of these findings that the Type A behavior pattern is not related to risk for coronary disease given the highly selected group of men studied.

The validity of the interview procedure used in the MRFIT study has also been questioned by a number of researchers. Scherwitz (1988a) conducted a detailed study of a sub-sample of the structured interviews done from the MRFIT study and found a number of measurement and reliability problems in the interviewing process. In addition, Scherwitz (1988b) and Friedman (1988) reported differences between the interview behaviors in the WCGS and the MRFIT study on variables such as the number of questions and follow-up probes asked, the amount of time available to observe the behavior of subjects, the length of the interview, and the number of interruptions, bringing into question whether these differences affected the predictive and discriminant

validity of behavior type judgements.

Ragland and Brand (1988) investigated the association between Type A behavior and mortality due to CHD for the WCGS subjects who had manifested signs of CHD at the 8.5 year follow-up by comparing the original structured interview behavior type judgements made at the onset of the WCGS to mortality 22 years later. From the original study, 7% of the entire sample developed signs of CHD at the 8.5 year follow-up, and two thirds of these were Type As (Evans, 1990). Even though the group investigated at the 22 year follow-up included more Type As than Type Bs, Ragland and Brand (1988) found that mortality from CHD incidence was higher amoung Type B persons who had survived an original coronary problem.

Studies supporting and not supporting the risk associated with Type A behavior have been found to differ in two important ways, in terms of the instrument used to assess Type A behavior and whether the sample studied was high risk or population-based (Haynes & Matthews, 1988a; Evans, 1990). Of the prospective studies reported above, a majority of those

that found either no association, or a negative association, between Type A and CHD used the JAS rather than the SI to assess Type A behavior, and sampled high risk subjects rather than unselected subjects from the general population. The assessment issue will be discussed in more detail later in this section. Findings from high risk studies are difficult to interpret because subjects who have elevated risk may be different in important respects from unselected subjects (see Evans, 1990, and Haynes & Matthews, 1988a, for a review of this issue).

Inconsistent findings on the risk associated with the Type A pattern between studies which used the JAS and those which used the SI bring to the forefront issues of conceptualization and assessment. Different assessment instruments utilized to designate Type A/B status tap quite different aspects of the behavior pattern. Given the inconsistencies in the literature concerning the association between Type A and CHD, the idea has emerged that not all aspects of the pattern play an important role in the disease process. As Matthews and Haynes (1986) have pointed out, sufficient

data are not available to show with certainty which aspects of Type A are inimical to cardiovascular health. Some investigators (Blumenthal, Williams, Kong, Schanberg, & Thompson, 1978; Williams et al., 1980) have reported a positive association between SI-assessed Type A and CHD but no relationship between JAS-assessed Type A and CHD in the same sample. Recent reviews have indicated that SI-assessed Type A status has a stronger association to CHD than does JAS-assessed Type A status (Booth-Kewley & Friedman, 1987; Matthews, 1988; Dembroski & Costa, 1988). Research has recently begun to move towards identifying which components of the pattern are most important in predicting disease endpoints. These component analyses studies will now be reviewed.

Matthews, Glass, Rosenman, and Bortner (1977) reanalyzed interview data from the WCGS and found that a high drive level characterized by explosive voice modulation, vigorous answers, and potential for hostility, in conjunction with irritation at waiting in lines, best distinguished CHD patients from nonpatients. Hecker, Chesney, Black and Frantschi

(1988) also reanalyzed the SI data from the WCGS. In comparison to Matthews et al. (1977), these researchers used a larger sample over a longer follow-up period (8.5 years), a wider age range, multiple raters, and controlled for standard CHD risk factors in multivariate analyses. Results indicated that hostility was significantly related to CHD incidence even after controlling for the global Type A rating and standard CHD risk factors.

Dembroski, MacDougall, Williams, Haney and Blumenthal (1985) investigated the association between different components of the Type A behavior pattern and CHD. Type A scores derived from the SI included a global Type A score, stylistic/clinical features (including explosiveness of speech, potential for hostility, and suppression of anger), and a self-report score that tapped time pressure, competitiveness, and anger-impatience. While no association was found between CHD and global SI-assessed Type A, potential for hostility and suppressed anger were significantly related to disease endpoints. In a retrospective study by Williams et al. (1980) the Type A structured

interview and a hostility scale were administered to patients undergoing angiography. Both SI-assessed Type A and hostility scores were found to be associated independently with the presence of atherosclerosis, with hostility scores showing the stronger association.

The relationship between hostility and CHD has been supported further by three prospective studies. Shekelle, Gale, Ostfeld, and Oglesby (1983), and Barefoot, Dahlstrom and Williams (1983), found that hostility scores significantly predicted death from coronary heart disease (and death from all other causes). Koskenvuo, Kaprio, Rose, Kesaniemi, Sarna, Heikkila, and Langinvainio (1988) looked at the predictive association between hostility and ischemic heart disease during a 3-year follow-up of 3,750 Finnish men. Results indicated that hostility was associated with increased mortality from all causes, including cardiovascular mortality. Also, while hostility did not predict ischemic heart disease (IHD) at 3-year follow-up among originally healthy men, among men with previous IHD and hypertension, the relative risk of IHD between the highest and lowest group was

12.9.

In summary, a number of studies and recent reviews of the literature (Dembroski & Williams, 1989; Dembroski & Costa, 1988; Matthews, 1988) clearly indicate that hostility is an important factor to consider in the prediction of CHD. It is important to note that most of the studies reported previously that failed to support the risk status of Type A utilized the JAS, which does not assess hostility. However, some studies employing the SI have also produced negative results. In attempting to explain inconsistent findings in the literature, Dembroski et al. (1985) argued that the relative weighting given to the hostility component in assessing Type A status using the SI could account for the variation in the strength of association found between Type A and CHD across studies.

Research directed at the link between the Type A behavior pattern and coronary heart disease has focussed not only on incidence and recurrence studies, as described above, but also on severity of myocardial infarction, degree of underlying atherosclerosis, and alterations of the Type A/B behavior pattern. Rosenman,

Friedman, and Jenkins (1967) and Jenkins, Rosenman, and Zyzanski (1974) found that the Type A pattern was positively correlated with severity of myocardial infarction. An excellent review of the studies investigating the association between Type A and severity of atherosclerosis can be found in Haynes and Matthews (1988b), and thus will not be covered here in any great detail. There are as many studies in this area to support as to refute the hypothesis that risk is conferred by global Type A status. Haynes and Matthews (1988b) concluded that Type A behavior is associated with CAD only if measured by the SI method, and pointed out that the angiographic studies are difficult to interpret due to many methodological problems. The cross-sectional nature of most studies precludes determination of the temporal relationship between risk factors and CAD. In addition, the propensity of subjects to have multiple cardiac problems and the high prevalence of Type As in studies using the SI make the results difficult to generalize. It is important to note, however, that when researchers began to focus on individual components of the Type A

behavior pattern, a positive relationship emerged between hostility/anger held in and the extent of arterial occlusion (Dembroski et al., 1985; MacDougall et al., 1985; Frank, Heller, Kornfeld, Sporn, & Weiss, 1978).

Reduction in Type A behavior has been found to be related to decreased cardiovascular morbidity and mortality in the Recurrent Coronary Prevention Project (Friedman, Thoresen, Gill, Ulmer, Powell, Price, Brown, Thompson, Rubin, Breall, Bourg, Levy, & Dixon, 1986). Friedman et al. (1986) investigated whether Type A behavior could be altered in postmyocardial infarction patients and whether this, in turn, would reduce subsequent cardiac events. The importance of such a study, as noted by Matthews and Haynes (1986), is that, if change in the risk factor through intervention can lead to change in the disease rates, then a causal link can be established. Eight hundred and sixty-two patients, 90% of whom were men, volunteered to be randomly assigned to either a control group or an experimental group. Those in the control group received group cardiac counselling which focussed on enhancing

compliance to dietary, exercise, and drug regimens. Those in the experimental group also received standard cardiac counselling in addition to Type A behavior counselling.

Experimental subjects showed the greatest decrease in Type A behavior throughout the 4.5 years of the study. Cardiac recurrence rate and cardiac death were significantly lower in the experimental group relative to the control group (the latter was significant only during the last 3.5 years of the study). These findings established the pathogenic role of Type A. However, primary prevention studies are required to further clarify the role played by this behavior pattern in the disease process within a normal sample.

A study was carried out by Gill, Price, Friedman, Thoresen, Powell, Ulmer, Brown, and Drews (1985) to determine whether Type A could be altered in disease-free military officers; it was thought that the success of Friedman et al. (1986) might have been due to behavioral changes generated by an earlier infarction. The experimental group received Type A behavior counselling while the control group received no

counselling of any kind. The experimental group showed significantly greater decreases in Type A relative to the control group. In addition, those officers who exhibited a large decrease in Type A behavior (two standard deviations or more) were also found to have lower mean serum cholesterol values. This difference was not due to differences in diet or exercise.

Consistent with the two studies previously discussed, investigators in The Montreal Type A Intervention Project found behavioral intervention to be effective in reducing Type A behaviors. Roskies, Seraganian, Oseasohn, Hanley, Collu, Martin and Smilga (1986) investigated the efficacy of three different intervention programs (aerobic exercise, behavioral stress management, and weight training) in altering both physiological response to psychosocial stressors and Type A behavior as manifested in the SI. However, while subjects in the stress management group showed the greatest decrease in Type A behavior, no mode of intervention was found to predict significant changes in heart rate or blood pressure during a stressful task.

In summary, the risk associated with the Type A behavior pattern varies with the assessment instrument used and the characteristics of the population studied. In general, evidence exists to support the greater risk of Type A individuals for coronary heart disease incidence, particularly among initially healthy, white collar men. As well, research on altering the behavior pattern has provided support for a pathogenic role of Type A in CHD. While studies employing high-risk samples or angiographic measures appear to offer little support for Type A as a risk factor, this research must be considered in light of the methodological problems inherent in these studies. Since most of the studies reviewed employed the JAS, which does not appear to sample hostility and/or anger expression, the results do not address the issue raised in the recent literature, which identifies the hostility component of Type A as highly predictive of morbidity and mortality.

Physiological Pathways Linking Type A to Coronary Heart Disease

Researchers have offered the hypothesis of a hyperresponsive sympathetic nervous system in response to challenging situations (Dembroski, MacDougall, Herd, & Shields, 1979; Price, 1982) as a means of clarifying how Type A influences CHD risk. However, knowledge of the exact physiological mechanisms involved is limited. Many researchers have addressed this issue, and the reader is referred to these sources for a more in-depth appreciation of the possible pathophysiological mechanisms involved (Price, 1982; Matthews & Haynes, 1986; Williams, Barefoot, & Shekelle, 1984; Glass, 1977; Dembroski, Weiss, Shields, Haynes, & Feinleib, 1978; Siegel, 1984). Only a brief overview will be provided here.

The Type A behavior pattern appears to be linked to coronary heart disease via the sympathetic-adrenal-medullary system and the pituitary-adrenal-cortical system (Herd, 1983). Activation of the sympathetic nervous system results in heightened catecholomine levels, and increased heart

rate and blood pressure (Haft, 1974; Eliot, 1979). Excess catecholomine levels play a role in platelet aggregation which can lead to arterial thrombosis (Theorell, 1973). Arterial clotting decreases blood flow, places greater demands on the heart, and may induce an oxygen deficit (Simonsen & Kjekshus, 1978) which increases the chances of necrosis or disturbances in heart beat regulation (Bloom & Herd, 1983). Elevations in blood pressure and heart rate are thought to promote arterial damage (Herd, 1978; Siegel, 1984), thus contributing to the atherosclerotic process which is hypothesized to be the underlying disease process in coronary heart disease (Krantz, Baum, & Singer, 1983).

Some proposed cardiovascular consequences of chronic activation of the sympathetic nervous system (elevated blood pressure, elevated catecholamine and cholesterol levels, and increased heart rate) parallel physiological and biochemical activity noted in Type A individuals under challenging situations (Dembroski et al., 1978; Glass, Krakoff, Contrada, Hilton, Mannucci, Colins, Snow, & Elting, 1980; Pittner & Houston, 1980; Friedman, Byers, Diamant, & Rosenman, 1975; Rosenman &

Friedman, 1974). However, some studies did not find overall differences in physiological arousal under performance challenge conditions in Type As relative to Type Bs (Price & Clarke, 1978; Scherwitz, Leventhal, Cleary, & Laman, 1978). Type As have, however, been found to have faster clotting time (Friedman & Rosenman, 1974) and enhanced platelet aggregation (Simpson, Olewine, Jenkins, Ramsey, Zyzanski, Thomas, & Hames, 1974).

Studies on differential autonomic reactivity in Type As relative to Type Bs assessed in the course of normal day-to-day activities have provided inconsistent results (Dembroski, MacDougall, Herd, & Shields, 1983). This suggests that Type As may differ from Type Bs in their physiological response threshold rather than in their baseline levels of physiological functioning (Jenkins, 1983).

Although there is considerable evidence that many psychophysiological and psychoneuroendocrine differences exist between Type As and Type Bs, these mechanisms have yet to be studied directly in conjunction with CHD endpoints. Thus, these hypotheses

must remain speculative (Williams, 1978) and necessarily lack some degree of specificity.

Psychological Mechanisms, the Type A Behavior Pattern, and CHD

In an attempt to understand why individuals display the behavioral constellation that constitutes the Type A pattern, and to understand its pathogenic role in the development of coronary heart disease, researchers have investigated the importance of a number of psychological characteristics. These include perceived lack of control (Glass, 1977), high self-involvement (Scherwitz, Berton, & Leventhal, 1978), and ambiguous standards for evaluation (Matthews and Siegel, 1983).

Glass (1977) conceptualized Type A behavior as an overt response pattern to stressful stimuli. Type A individuals are seen as possessing an increased need to master their environment. Thus, when faced with stimuli which are perceived as a threat to their sense of control, they react with enhanced efforts to reinstate control. Such active coping entails both behavioral and

physiological hyperresponsivity (Matthews, 1982). As discussed previously, physiological hyperactivity has been implicated in the pathogenesis of CHD.

Scherwitz et al. (1978) proposed that Type As were more self-involved than Type Bs, since they were found to have made twice as many self-references during the SI. These researchers argued that self involvement may increase self awareness which in turn may lead to higher standards for performance, inducing increased responsivity to challenge. When performance standards are high, discrepancies between performance and goals may result in excessive striving and frustration (Matthews, 1982), thus contributing to the competitive-achievement striving and impatience (Siegel, 1984) characteristic of Type A individuals. Self-referencing has been found to be associated with cardiovascular reactivity, number of previous myocardial infarctions, and the extent of angiographically-determined CHD (Scherwitz et al., 1978) supporting the proposition that this psychological characteristic may mediate Type A behavior and physiological reactivity.

A third approach to conceptualizing the origins of the Type A behavior pattern has been offered by Matthews and Siegel (1983). These researchers proposed that Type A behavior is generated out of a high value placed on productivity with concomitant ambiguous standards for evaluating that productivity. The result of these processes is hypothesized to be continuous striving toward ever-escalating goals, and a sense that time is passing rapidly.

While each of these psychological approaches have been shown to have some value for describing Type A behavior, the predictive value of each of these approaches can be properly evaluated only by longitudinal research. What is striking about these approaches is that all three suggest that the Type A behavior pattern can, in itself, potentiate stress. A struggle for mastery, keen self-awareness, and excessive striving toward ever-escalating goals in the face of challenge should predispose the individual to a self-perpetuating stress cycle. Indeed, it has been proposed that the Type A individual may experience prolonged stress from the self-imposition of deadlines

and a rapid, competitive, and aggressive work style (Suinn, 1982). The importance of stress is underlined by its established association with illness in general (Rabkin & Struening, 1976) and coronary heart disease in particular (see review that follows). Over the last several years a number of researchers have examined the potential link between psychological stress factors and coronary heart disease. Several classes of psychological stressors have been linked to the major cardiovascular disorders.

Jenkins (1971b) reported increased risk of mortality from heart disease in coronary patients who reported more dissatisfaction with their work. The job aspects which were targeted as sources of dissatisfaction included tedious work, lack of recognition, poor relations with co-workers, and poor working conditions. This finding was supported in a study by Theorell and Rahe (1972), who also found that post-myocardial infarction patients reported less satisfaction with work and longer work days. Kittel, Kornitzer, and Dramaix (1980) found that job stress was associated with elevated blood pressure levels which,

as discussed previously, are related to CHD.

One problem with the studies previously cited linking job stressors to coronary heart disease is that they are retrospective in nature. Retrospective studies are subject to interpretation difficulties since illness episodes may influence reporting.

A number of prospective studies have reported a positive association between coronary heart disease endpoints and earlier job responsibility, work overload, career mobility, and tension at work (Haynes et al., 1980; Theorell, Lind, & Floderus, 1975; Kornitzer, Kittel, Dramaix, & de Backer, 1982). However, Sobolski, de Backer, Degre, Kornitzer, and Denolin (1981) found no relationship between job stress and later coronary disease risk factors such as heart rate, blood pressure, and cholesterol levels.

Numerous researchers have investigated the effects of life change as a psychological stressor. Cooper, Faragher, Bray, and Ramsdale (1985) indicated that adverse life events contribute to the prediction of CHD risk. Myocardial infarction patients have been found to experience a significant increase in stressful life

events just prior to heart attack (Theorell & Rahe, 1971; Rahe, Romo, Bennett, & Siltanen, 1974). In fact, Rahe et al. (1974) reported that the greatest increase in life changes occurred 6 months prior to the CHD event, with subjects who experienced CHD crises of the highest severity (death) showing greater life change elevations during the final 6 months of life than subjects who survived their event. Rahe, Ward and Haynes (1979) found a decrease in reinfarction rates for subjects who had undergone a treatment intervention that included a life stress coping component. Finally, career mobility was found to be predictive of heart disease in blue collar workers but not in white collar workers (Haynes et al., 1980) and in lower social class but not in higher social class men (Kaplan, Cassel, Tyroler, Cornoni, Kleinbaum, & Hames, 1971). This differential susceptibility was thought be be due to differences in adaptability to change. It has been proposed that lower level workers are less prepared to adapt to upward social mobility and that such movement entails greater adjustment for them than it would for higher social class males who are more familiar with

the expectations and life style of a new position (Kaplan et al., 1971).

In summary, although some of the studies cited on stress and CHD are retrospective in nature and thus carry certain limitations of interpretation, the majority of evidence suggests that psychological stress is an important factor to consider in CHD research. Further support for this contention comes from research which shows that stress is linked to increased heart rate, blood pressure, and catecholamine levels (Dembroski et al., 1979; Kornitzer et al., 1982; Glass, 1983).

A number of studies lend support to the contention that Type A individuals experience more stress than Type B individuals. Type A men tend to have more income and job changes than Type B men (Mettlin, 1976). As well, Type As have been reported to experience a greater number of stressful life events than Type Bs (Somes, Garrity, & Marx, 1981; Suls, Gastorf, Witenberg, 1979). Type A individuals in managerial positions also reported longer work weeks and more business trips per year than did Type B managers

(Howard, Cunningham, & Rechnitzer, 1977).

Rhodewalt, Hays, Chemers, and Wysocki (1984) studied the effects of life change and job stress on physical symptoms related to cardiovascular problems in a sample of Type A and Type B university administrators. Although there were no main effects for A/B status on job stress, those Type As who reported job stress also reported the greatest number of physical symptoms of heart disease. Type As also reported more life changes overall and more life changes which were perceived as controllable. However, only undesirable, moderately controllable life changes were related to cardiovascular problems.

Kelly and Houston (1985) investigated the relationship between Type A behavior and various work-related variables for women who were employed full-time outside the home. Results indicated that Type A women, in comparison to Type B women, had higher occupational levels, worked more overtime hours, preferred to work more overtime hours, and reported a heavier work load and more role conflict in the work place. In addition, Type A women reported experiencing more daily stress

and tension than their Type B counterparts. Kelly and Houston (1985) pointed out that although reported stress and tension are not direct measures of neuroendocrine arousal, they can be considered to be arousal-related symptoms, and as such are relevant to the link between Type A and CHD as indicated in the earlier section on physiological reactivity.

Sorensen, Jacobs, Pirie, Folsom, Luepker, and Gillum (1987) examined the relationship of Type A behavior to men's and women's work hours, occupational mobility, and job-related interactions and found that, for both sexes, Type A behavior was related to long work hours, high occupational mobility, and nonsupportive interactions with co-workers.

Research with children who are classified as Type A also indicates higher stress levels. Eagleston, Kirmil-Gray, Thoresen, Wiedenfeld, Bracke, Heft, and Arnow (1986) examined the physical health correlates of Type A behavior in children in grades 5, 7, and 9, and found that children with high Type A scores reported significantly more general daily stress and tension, and significantly more symptoms of stress (eg.

cardiovascular symptoms, muscle tension, and sleep problems) than children with low Type A scores.

A number of studies suggest that the behavior of Type A individuals creates stress, or places them in more stressful situations. Holmes, McGilley and Houston (1984), and Ortega and Pipal (1984) found that Type A individuals, in comparison to Type Bs, showed a preference for more challenging and demanding tasks. Snow (1978) found that Type As set higher standards for performance prior to and during a cognitive task than Type Bs, which may suggest differential appraisal of task demand (Smith & Anderson, 1986). Manuck and Garland (1979) looked at the level of satisfaction with performance on a challenging task and found that As were less satisfied than Bs, even though their performance did not differ. When given the chance for feedback concerning their assets and liabilities (based on their performance on a series of tests), Lifshitz-Cooney and Zeichner (1985) found that Type As, in comparison to Type Bs, were more interested in negative than in positive feedback.

As indicated above, there is evidence to suggest that Type As may experience more stress than Type Bs. Given the common description of Type As as being hard driving, achievement oriented, working at near-maximum capacity, impatient with delays, continuing to subject themselves to stressful situations long after Type Bs have stopped, suppressing feelings of fatigue that might interfere with successful performance (Glass, 1977), and disregarding the importance of recreation (Jenkins et al., 1974), it is not unreasonable to suggest that this style of behavior might be conducive to a more stressful existence. There is also some research which suggests that an easy going disposition, like that characteristic of the Type B pattern, may provide resistance to stress (Holahan & Moos, 1987). Hinkle (1974) observed that individuals who remained healthy under stress were those who experienced significant change without a profound emotional or psychological response, while Holahan & Moos (1985) found that individuals who described themselves as more easy-going adapted to stressors more successfully than did persons who saw themselves as less easy-going.

An alternative hypothesis is that Type A individuals do not experience more stress than Type B individuals but do lack a protective mechanism such as social support that could serve as a buffer for stress. Of course, the social support hypothesis is not inconsistent with an elevated stress hypothesis. In fact, its relevance is at least equally feasible either alone or in conjunction with increased stress to explain susceptibility to CHD.

The Role of Social Support

A substantial body of literature exists which links social support to stress adaptation, physical and mental health, and illness in general. In a review of some of the areas in which social support has been demonstrated to have significant health-related effects, Cobb (1976) concluded that social support provides a protective influence which reduces the physically degenerative effects of life stress. Cassel (1976) and Kaplan, Cassel, and Gore (1977) reported that having meaningful social contacts is associated with more favorable health outcomes (eg. fewer

indicators of ill health, reduction in stroke mortality, and lower blood pressure levels). Greater social resources have also been linked to a reduction in the impact of life stress on psychological coping, remaining healthy when under stress, and greater speed of recovery from illness (Wilcox, 1981; Moos, 1985; Wallston, Alagna, DeVellis, & DeVellis, 1983). Lin, Simione, Ensel, and Kuo (1979) looked at the relationship between social support and psychiatric symptoms and found that having ties to the community accounted for 62% of the explained variance in psychiatric symptoms even after controlling for marital status, occupational prestige, and stressful life events.

A number of studies have looked at the relationship between social support and mortality rates. Ruberman, Weinblatt, Goldberg, and Chaudhary (1984) collected information on the level of social isolation in individuals 6 weeks after an acute myocardial infarction. The level of social isolation was determined on the basis of the extent to which patients sought out information from medical personnel

concerning the need for life changes, club membership, affiliations with religious organizations, and visits with friends or relatives. Results indicated that high levels of social isolation made a significant independent contribution to the risk of death over a period of 3 years.

Blazer (1982) investigated the ability of various aspects of social support to predict mortality status in a high risk group of elderly individuals. At a 30-month follow-up, three separate paramenters of social support - perceived support, frequency of social interactions, and type plus availability of attachments - significantly predicted mortality status after controlling for such confounding factors as baseline physical health, daily activity, depression, and age. A number of other prospective studies have found low levels of social support to be associated with increased mortality (Berkman & Syme, 1979; House, Robbins, & Metzner, 1982; Welin, Tibblin, Svardsudd, Tibblin, Ander-Peciva, & Larsson, 1985; Schoenbach, Kaplan, Freedman, & Kleinbaum, 1986).

Of greatest relevance to the present study are studies that have investigated a relationship between social ties and CHD. A number of studies indicate that coronary patients have been found to report less satisfaction in personal relations, more marital difficulties and more conflicts and problems with co-workers (Medalie, Snyder, Groen, Nuwfeld, Goldbourt, & Riss, 1973; Wolf, 1969; Liljefors & Rahe, 1970; Bruhn, Wolf, Lynn, Bird, & Chandler, 1968; Jenkins, Zyzanski, Ryan, Flessas, & Tannenbaum, 1977). However, these studies were retrospective in nature and thus susceptible to the possibility that the subject's illness may have influenced evaluations of personal relationships.

Berkman (1982) reviewed a number of unpublished studies on the relationship of social support to illness in general and CHD in particular. When high levels of support were available from coworkers, there was little relationship between occupational stress and heart disease. High levels of social support were also found to be directly associated with a lower prevalence rate of CHD.

Seeman and Syme (1987) investigated the relationship between both structural and functional support and the extent of coronary atherosclerosis in angiography patients. While structural support referred to the network size and the presence of specific types of network ties (marital status, number of close friends and relatives seen or talked to at least once a month, regular church attendance, and formal group membership) functional support was indicated by measures of instrumental support (the frequency with which family and/or friends were reported as sources of assistance), problem-oriented emotional support (advice on personal problems), and general emotional support (a sense of being loved). Findings indicated a significant negative association between both instrumental support and general emotional support and the extent of atherosclerosis. However, structural characteristics and problem-oriented emotional support were not found to be significantly associated with atherosclerosis.

In a 9-year prospective epidemiological study, Berkman and Syme (1979) found that having fewer social or community ties was associated with double the rate

of death from all causes, including heart disease, after controlling for age, baseline health status, health practices, and the use of preventive health services.

House et al. (1982) found that having fewer social relationships and social activities had generally strong and significant predictive associations with death due to ischemic heart disease among women; for men, these variables were significantly related to mortality in general, but not to heart disease in particular. No association was found between satisfaction with social support and heart disease for either men or women.

Reed, McGee, Yano, and Feinleib (1983) and Reed, McGee and Yano (1984) looked at the relationship between the extensiveness of social support networks, as measured by the number of personal and social interactions, and the prevalence and incidence of CHD in a prospective study of a cohort of Japanese-American men living in Hawaii. Results indicated that having fewer social interactions was associated with a higher prevalence rate of angina pectoris and coronary heart

disease in general. However, this association was not significant for the incidence data.

Medalie and Goldbourt (1976), in a five year prospective study, investigated the relationship between the incidence rates for angina pectoris and the quality of support received from wives of initially healthy Israeli men. After controlling for traditional risk factors, husband's reports of their wife's love and support was associated with reduced risk of angina pectoris. Finally, in an 8-year prospective study, Haynes and Feinleib (1980) found that, among working women, in clerical positions, lack of support from the boss was an independent predictor of CHD.

In summary, the research supports the notion of a relationship between social support and cardiovascular disease, such that diminished social ties are associated with higher levels of heart disease. The literature however, is inconsistent concerning the relative importance of qualitative or functional aspects of support (satisfaction with one's social ties and perceptions of available support) and quantitative or structural support (network size, intimate ties vs

formal ties). As has been indicated, in some instances qualitative or functional support has been found to show the strongest relationship with CHD, while in other instances quantitative or structural support has appeared to be more important. Broadhead, Kaplan, James, Wagner, Schoenbach, Grimson, Heydon, Tibblin, & Gehlbach (1983) point out that one problem with social support research is the lack of agreement on how to define and measure support. Seeman and Syme (1987) have noted that there is little comparative data on the relative importance for disease etiology of structural versus functional approaches to social network assessment, and have recommended comparison of both of these aspects of support in order to increase our understanding of the relationship between social ties and host resistance.

Potential Implications of Type A Behavior for Social Relationships

Central characteristics of the Type A behavior pattern include competitive achievement striving, aggressiveness, hostility, impatience, a task

orientation as opposed to a people orientation, and a tendency to interrupt when interacting with others and to finish others' sentences (Matthews 1982; Smith & Anderson, 1986; Scherwitz, Berton, & Leventhal, 1977). All of these would appear to have clear, and probably negative, consequences for others interacting with the Type A individual.

The interpersonal styles of Type A and Type B individuals has been investigated through contrived social situations in the laboratory. Van Egeren (1979) presented pairs of subjects (two Type As, two Type Bs, or one Type A, and one Type B) with a computerized game which allowed subjects to choose to cooperate, compete, punish, reward, or withdraw in an effort to gain points to win. Type As generally tended to be more deceptive and tried to outwit their opponent, whereas Type Bs' game strategy led to mutual gains and losses. More specifically, Type A dyads competed twice as often and cooperated with and rewarded each other significantly less often than Type B dyads. Type A dyads favoured competition more than Type B dyads; they sent five times as many messages about competing and indicated

that they liked it when their partner played competitively. Significant differences only occurred when Type A dyads were compared to Type B dyads. When Type As interacted with Type Bs they tended to be more cooperative and less competitive than Type A dyads but less cooperative and more competitive than Type B dyads. Related to this issue of competitiveness, Van Egeren (1979) and Van Egeren, Sniderman and Roggelin (1982) found that Type A dyads expressed more dominance, defined as behaviors indicative of attempts to control and guide the other person, than Type B dyads.

It may be that, because of their achievement striving and competitiveness, Type As ignore performance information and refuse to relinquish control to another (Strube, Berry, & Moergen, 1985). This need for dominance or control is consistent with findings that, even in situations where cooperation could lead to a more beneficial outcome, Type As prefer to maintain control; this is true even when they are given the opportunity to relinquish control to a partner whose competence is perceived to be equal to or

superior to their own (Miller, Lack, & Asroff, 1985; Strube, Berry, & Moergen, 1985). Finally, Wright, Von Bussmann, Freidman, Khoury, and Owen (1990) found that Type A behavior was related to exaggerated needs for social control and a tendency to control others inappropriately in social situations. Need for social control is indicated by endorsement of items such as "I like to be bossy", and "I may be inclined to interrupt people if they are not responding in the way they should be".

The expression of interpersonal aggression by Type A subjects was investigated in a study by Van Egeren (1979). When Type As interacted with each other, they behaved significantly more aggressively than did Type Bs who interacted together. That is, Type A pairs punished each other three times more often than Type B pairs, were more likely to respond negatively following a mutual negative response, sent more threatening messages, refused more often to receive messages from their partners, were less likely to satisfy their partner's request, and expressed more anger than Type B partners. These differences only occurred when Type As

interacted with other Type As. Type Bs tended to interact in a similar fashion with Type As and Type Bs.

Strube, Turner, Cerro, Stevens, and Hinchey (1984) and Holmes and Will (1985) also found Type A subjects to be significantly more aggressive than Type B subjects during a learning task: Type As administered significantly larger fines for wrong answers, even though the amount of the fines had no clear purpose in the learning tasks, and gave significantly higher levels of punishment (aversive noise) than did Type Bs.

Recent literature focussing on the hostility/cynicism component of the Type A behavior pattern has highlighted a disagreeable and uncooperative style of interpersonal interaction which includes argumentativeness, condescension, and rudeness (Dembroski, MacDougall, Costa, & Grandits, 1989). Dembroski et al. (1984) have argued that this pattern involves a basic mistrust of others. This is consistent with the findings of Van Egeren (1979) that Type As, in comparison to Type Bs, are more distrustful of others. This disagreeable and uncooperative interpersonal style and mistrust should serve to alienate Type As from the

people around them.

It thus seems clear that the Type A style of behavior has important implications for interpersonal relationships; that is, it would seem likely to be associated with weaker relationships with significant others. Indeed, investigators have suggested that Type A behavior may interfere with the development of an adequate social network (Matthews, 1982; Price, 1982).

There is some evidence to suggest that Type A individuals have problematic social relationships. Individuals identified as Type A report poor family relationships, low satisfaction in their interpersonal relationships, and nonsupportive interactions with co-workers (Burke, Weir, & DuWors, 1979; Waldron, Hickey, McPherson, Butensky, Gruss, Overall, Schmader, & Wohlmuth, 1980; Becker & Byrne, 1984; Sorensen et al., 1987). Barling, Bluen, and Moss (1989) found that husbands' Type A behavior was positively correlated with their own and with their wives marital dissatisfaction. Kelly and Houston (1985) did not find differences between Type A and Type B women in the quality of their marital relationships; however, women

who perceived their husbands to be high on Type A received lower scores on measures of marital happiness and marital adjustment. These findings are consistent with clinical impression that Type A individuals are often so deeply committed to their vocation that other aspects of their lives are neglected (Jenkins, 1971b). This view of Type As as people who maintain a narrow focus on work- or task-related issues is supported by Cohen's (1978) finding that Type As allocate full processing capacity to the task at hand and ignore social cues. Since social cues can provide us with information about the impact of our behavior on others and information necessary for the maintenance of relationships (Cohen, 1978), insensitivity to social clues may lead to an impoverishment of one's social ties (Jennings, 1983).

The view that Type As maintain a narrow focus on tasks is consistent with research on affiliative preferences. Type A individuals, in comparison to Type Bs, elect more often to work alone in a threatening situation, claiming that the presence of others is a hindrance (Dembroski & MacDougall, 1978). The

importance of this finding lies in the fact that similar preferences are expressed by individuals with coronary heart disease (Dembroski & McDougall, 1978) and that the presence of a friend during performance in stress-inducing tasks has been found to be associated with reduced cardiovascular response (Kamarch, Manuck, & Jennings, 1990). Kamarch et al. (1990) suggest that strong social ties may exert some direct psychophysiological influence in the direction of greater cardiovascular health.

Only recently have researchers begun to look directly at the association between Type A behavior and social support. Suls, Becker and Mullen (1981) asked male undergraduate students to respond to two questions measuring perception of available support and openness to social support, "I have no one to talk to about my personal problems" and "I prefer to keep my worries and my problems to myself". Type A individuals were more apt to feel that they had no one to confide in or to gain support from, but only if they were also high on social insecurity. Type A individuals reported significantly more often that they preferred to keep

their worries and problems to themselves. However, Type As and Type Bs did not differ significantly in the number of "good friends" reported. These investigators concluded that while Type As seem to have as many social contacts as Type Bs, these contacts are not perceived to be as supportive or as necessary for them.

Kelly and Houston (1985) looked at the relationship between social support and Type A for women employed full-time outside the home. Suls et al.'s (1981) items on perceptions of available support and openness to social support were used, as well as additional measures of amount ("how often") and source (supervisor, coworkers, husband, friends, relatives) of social support. While there was no direct relationship found between Type A (assessed using two different measures) and social support, JAS-defined Type As reported significantly more stress and tension when availability of support was high and significantly more stress when support from their supervisors and husbands was high. These findings are surprising given the well-established inverse relationship between social support and stress.

Waldron et al. (1980), using an index of social support which combined both perceived availability and amount of support, found that Type A undergraduate males, but not females, reported significantly lower social support scores. This suggests that they had fewer or less satisfactory social relationships.

Gill et al. (1985) found that reductions in an individual's Type A behavior were associated with significant improvements in listening skills, understanding and awareness of others, and a significant decline in feelings of hostility. Given the prosocial nature of these behaviors, it seems likely that such changes would have positive implications for the quality of relationships. Indeed, these researchers found an improvement in family relationships for those individuals who received counselling aimed at reducing Type A behavior.

One problem with studying the quality of social relationships of adults concerns how to gain access to data from sources other than the individual himself. Sole reliance on self reports can be problematic in that the individual's account may not be as complete as

that which can be obtained from additional sources. Studying children might eliminate this problem, since relevant data from peers and direct observation of behavior interactions is more readily available than it is for adults.

Recent research suggests that Type A children also have a behavioral style that is likely to result in increased interpersonal conflicts and that they have problems in their social relationships. Preschool Type A children display more frequent expressions of facial annoyance, cause more frequent interruptions of play in a classroom setting, punch a Bobo doll more frequently (Vega-Lehr & Field, 1986), and aggress against a Bobo doll sooner (Matthews & Angulo, 1980) than Type B children. Kurdek and Lillie (1985) found that parent ratings of their children's Type A behavior were associated with some problems of social competence. High scores for boys on an irritability factor derived from parent ratings on the MYTH were associated with being less well liked by classmates and low scores on self-report measures of friendship understanding, perspective taking, and social problem solving. For

girls, on the other hand, leadership factor scores derived from the parent MYTH were positively correlated with classmate likeability, understanding of friendship, and scores on perspective taking and social problem solving measures.

Whalen and Henker (1986) investigated the relationship between Type A behavior and a number of social competence variables for a small sample of normal boys taking part in a summer enrichment program. MYTH-assessed Type A behavior was found to be positively correlated with peer perceptions of being a trouble maker and both regular (neutral and positive) and negative (noncompliant and aggressive) contact with others, in a classroom setting. Also, peer perceptions of 'fun to be with' were negatively correlated with scores on the Impatience/Aggression factor of the MYTH.

A similar pattern of association between Type A and social functioning was found for samples consisting of both hyperative and normal boys (ratio 1:1) (Whalen & Henker, 1986), and hyperactive boys (Whalen, Henker, Hinshaw, & Granger, 1989). Boys who scored high on the MYTH were perceived by peers to be trouble makers and

uncooperative. High scores on the Impatience/Aggression factor were associated with fewer nominations as a best friend and as 'fun to be with'. The Competitive factor score was positively correlated with parent-assessed but not teacher-assessed peer popularity. There was also a significant negative correlation between Type A scores and program staff ratings of 'fun to be with', and a significant positive correlation between Type A scores and program staff ratings of trouble making and aggression. Finally, observations of classroom and playground behavior indicated that Type A scores were positively correlated with negative contact with others.

In conclusion, given the behaviors that constitute the Type A behavior pattern, the research suggesting weaker social relationships for Type As, and the evidence for an inverse relationship between social ties and illness, it seems likely that vulnerability to CHD by Type A individuals may, in part, be due to the absence or weakening of meaningful social relationships. It is evident that the quality of the social relationships of Type A individuals is worthy of

further investigation.

To embark on a study of the social relationships of Type A children, it first has to be established that Type A is a meaningful construct in childhood. The value for the prediction of heart disease in adulthood of Type A behavior in childhood has not yet been determined longitudinally. Thus, an evaluation of the usefulness or validity of the Type A construct in children must focus on studies of the psychometric properties of Type A measures for children, the behavioral similarities between Type A children and Type A adults, the physiological correlates of Type A behavior in children as developmental precursors to CHD, and finally, the stability of Type A behaviors over time.

Assessment of Type A Behavior in Children

Interview Schedules. Since the SI is considered to be the most powerful index of Type A in adults, it is not surprising that a number of structured interviews, such as the Adolescent Structured Interview, the Miami Structured Interview, and an interview schedule

developed by Butensky and his colleagues have been developed to assess Type A behavior in children.

Butensky, Faralli, Heebner, and Waldron (1975) developed an 11-question interview for children in grades 5, 9, and 12. Questions were adapted from both the SI and the JAS. While scoring focused mostly on the content of the answers, style of response was also considered. However, no reliability or validity data have been reported for this interview schedule.

The Adolescent Structured Interview (ASI) was developed directly from the Adult SI with modifications made only so that the questions were more appropriate to adolescent experiences. However, administration of the interview entails less challenge since the researchers reported that adolescents tend to withdraw from challenge in this type of situation (Siegel & Leitch, 1981). The interview is scored on the basis of content and a number of behavioral dimensions: interruptions of the interviewer, loud, explosive, rapid, and accelerated speech, quickness of response, passive hostility, and competition for control of the interview. Greater emphasis is placed on behaviors and

speech stylistics than is the case for the adult SI. It should be noted that "less Type A behavior is necessary for a child than for an adult to be classified as Type A" using this interview (Matthews & Jennings, 1984).

Factor analysis of this interview data has produced three factors: interview behaviors, impatience, and hard drivingness (Siegel, Matthews, & Leitch, 1981). These factors have been found to be associated with concurrent measures of anger, efforts to control, time urgency, and competitiveness-achievement striving (Siegel et al., 1981).

Further support for the construct validity of the ASI comes from research on cardiovascular arousal. Matthews and Jennings (1984) found that ASI-assessed Type A behavior was related to variability in heart rate and variability in both systolic and diastolic blood pressure. However, significant A/B differences were contingent on particular task requirements. Siegel et al., (1983) reported a significant relationship between Type A and both variability in and peak level of systolic blood pressure. No association was found

with diastolic blood pressure. Siegel (1982) found that ASI-identified Type As reported more cardiovascular arousal than Type Bs.

Inter-rater reliabilities for the ASI range from 75% to 93%. No sex differences have been found as a function of A/B status, but older adolescents are reported to have higher scores for the interview-assessed behaviors (Siegel & Leitch, 1981; Siegel et al., 1981; Matthews & Jennings, 1984). No test-retest reliability data have been reported.

The Miami Structured Interview (Gerace & Smith, 1985) was developed to serve a wider age range (7-18 years) of children and to provide a briefer interview measure. It was modelled in content, administration and scoring on the adult SI. Gerace and Smith (1985) reported interrater reliability ranging from 73% to 88% for A vs not-A categorizations and 81% to 96% for A vs B categorizations. However, when the number of categories was increased to include A1, A2, X, B, and A1, A2, X, B3, and B4, the reliabilities ranged from 42% to 62%. Gerace and Smith (1985) reported test-retest reliabilities ranging from 91% for an A vs

not-A comparison to 66% when all 5 categories were used. However, the length of time between administrations was only 5 minutes. Thus, the focus was very short-term rather than long-term stability of status over time.

Given that the SI is considered to be the most powerful index of Type A for adults, comparable schedules to assess Type A in children should prove to be valuable assessment measures. The provision of both behavioral data and self-report data represents an advantage over other measures. However, the use of interviews with children and adolescents is not without problems. Training for interviewers is both costly and time consuming, as is the collection and scanning of data utilizing this measure. While impressive validity and interrater reliability data are available for the ASI, concerns about the level of challenge, adolescents' ability to behave 'naturally' and spontaneously in the presence of a strange adult, and the lack of test-retest data may compromise the potential of this interview as a measure of Type A.

Matthews Youth Test for Health (MYTH). The Matthews Youth Test for Health is the most frequently used measure of Type A behavior in children. The MYTH is a teacher rating scale which contains 17 items, each rated on a 5-point scale ranging from extremely uncharacteristic (1) to extremely characteristic (5) (Matthews & Angulo, 1980). Items load on two factors, competitive-achievement striving (8 items) and impatience-aggression (9 items). A total score and a score for each of the two factors can be computed.

The MYTH has been shown to have very high internal consistency (.90) (Matthews & Angulo, 1980; Matthews & Avis, 1983). Interrater reliability has been found to be more variable, with estimates of r=.72 to r=.82 (Corrigan & Moskowitz, 1983) and r=.41 (Hunter, Parker, Williamson, Downey, Webber, & Berenson, 1985). Vega-Lahr and Field (1986) reported interrater reliability between teachers of.52 for the total score, .68 for the competitiveness factor score, and .41 for the impatience-aggressive score. Matthews and Volkin (1981) reported that female teachers had higher interrater reliability than male teachers (r=.70 and r=.48,

respectively). While test-retest reliability is generally high over short periods, longer follow-ups produce lower, yet still moderately high scores. Test-retest periods of 3 and 4 months produced reliability coefficients ranging from r=.79 to r=.99 (Matthews & Angulo, 1980; Corrigan & Moskowitz, 1983). Longer test-retest periods of 1 year (Matthews & Avis, 1983), 3 years (Parfenoff & Hanson, 1989), and 5 years (Visintainer & Matthews, 1987) produced reliability coefficients of r=.55, r=.38, and r=.39 respectively. Test-retest reliability has also been found to vary with race, ethnicity, age, and gender of the child being rated (Murray & Bruhn, 1983; Murray, Bruhn, & Bunce, 1983).

Fairly consistent gender differences for MYTH-assessed Type A scores have been reported in the literature, with preschool and grade school boys receiving significantly higher Type A scores from their teachers than girls (Matthews & Angulo, 1980; Corrigan & Moskowitz, 1983; Murray et al., 1983).

Evidence that the MYTH scale does measure Type A behaviors of aggression, competitiveness, impatience,

and achievement striving come from both observational studies and studies correlating the measure with other rating scales. Under laboratory conditions, Type A children have been found to be more aggressive, impatient, and competitive than Type B children in the presence of a female but not a male experimenter (Matthews & Angulo, 1980). Type As also made greater efforts to excel and reported less fatigue than Type Bs (Matthews & Volkin, 1981; Corrigan & Moskowitz, 1983). Although Matthews and Angulo (1983) found Type A children to be more restless and impatient while performing an experimental task, this was not confirmed in a preschool sample studied by Corrigan and Moskowitz (1983). However, Corrigan and Moskowitz (1983) did find that Type As were rated by their teachers as higher on impatient classroom behavior relative to Type Bs.

Whalen and Henker (1986) found that the competitive-achievement striving factor of the MYTH correlated significantly with both peer and teacher ratings of athletic ability, observations of task attention in the classroom, and leadership behavior during game playing. The impatience-aggression factor

correlated highly with classroom observations of making noise, bothersome/annoying physical contact, talking, off-task behavior, peer nominations of causing trouble, infrequent peer nominations for the item 'fun to be with', and 'a good student', and self ratings of higher aggressiveness, higher hyperactivity, and lower attention span (Whalen & Henker, 1986). Hunter et al. (1985) and McCendie (1987) have also reported very high overlap between the MYTH and measures of behavior problems in children. This research suggests that, since the MYTH is very similar to preexisting measures of hyperactivity and aggression in children, either problems exist with the MYTH as a measure of Type A behavior in children or the construct of Type A in childhood, at least as measured by the MYTH, needs to be clarified to demonstrate how it differs from childhood behavior problems.

Hunter-Wolf A/B Rating Scale (A/B scale). The Hunter-Wolf A/B Rating Scale is a self-rating measure of Type A behavior which has been used with children as young as 8 years of age (Hunter et al., 1985). It

contains 24 items which provide contrasting behaviors, such as "I walk fast" and "I walk slow", and subjects are asked to rate themselves on a 7-point continuum. The 24 items load on four factors: restlessness-aggression, eagerness-energy, leadership, and alienation (Wolf, Sklov, Wenzl, Hunter, & Berenson, 1982). These factors are consistent with the conceptualization of Type A behavior in the adult literature.

The A/B scale has been shown to have moderate internal consistency (r=.59) (Wolf et al., 1982). Test-retest reliability has been found to be moderate to high, r=.84 after 6-weeks (Amos, Hunter, Zinkgraf, & Berenson, cited in Hunter et al., 1985), and r=.70 after 1 year (Weidner, McLellarn, Sexton, Istvan, & Conner, 1986). Type A status assessed using this measure, has been found to be associated with elevated levels of serum cholesterol, triglycerides, and lipoproteins (Hunter, Wolf, Sklov, Webber, Watson, & Berenson, 1982), variables that have been shown to be related to elevated risk for heart disease in adults. A/B scale-assessed Type As have been found to speak louder during a reading task, to eat and walk faster,

to be more competitive and more achievement oriented, and to perceive time as passing more quickly (girls only) than Type Bs (Wolf et al., 1982).

Wolf and her colleagues (Hunter & Webber, 1979) reported no sex differences on the A/B scale. Manning, Balson, Hunter, Berenson, and Willis (1987) did find that both boys and girls in an upper SES-urban group were more Type A than boys and girls in a lower SES-rural group, with no difference between boys and girls in the prevalence of Type A within either SES group. However, Bishop, Hailey and Anderson (1987) have reported that boys responded significantly more in the Type A direction on the A/B Scale than did girls.

Race differences have been found, with white children obtaining higher Type A scores than black children, and Type A scores have been reported to increase with age (Wolf et al., 1979; Wolf, Hunter, Webber, & Berenson 1981; Hunter et al., 1985; Amos, Hunter, Zinkgraf, Miner, & Berenson, 1987). Manning et al. (1987) reported no significant age differences for Type A status. However, those studies that reported an age change used a wider age range of subjects (Wolf et

al., 1981 used 10 - 17 year olds; Hunter et al., 1985, and Amos et al., 1987 used 8 to 17 year olds) and older subjects than did Manning et al. (1987), who studied children between the ages of 9 and 14 years. This discrepancy in findings may be accounted for by these differences. Hunter et al. (1985) hypothesized that an increase in Type A status with age would be consistent with the hypothesis that this behavior style is learned.

Summary of Measures

Determining which measure to use when studying Type A behavior in children depends on the psychometric data available in support of each measure as well as on practical considerations.

Of the three interviews available, the Adolescent Structured Interview has the most extensive supporting psychometric data, which, overall, indicate that the ASI is an acceptable measure of Type A behavior. However, it has been developed for a population older than that which has been targeted for the present study. As well, interview methods are less feasible

when the necessarily large expenditure of time and money required for training, data collection, and scoring poses a problem.

The MYTH and the Hunter-Wolf A/B Rating Scale are the two most frequently used methods for assessing school-aged children's Type A behavior (Bishop, Hailey & Anderson, 1987). Neither scale requires specialized training and both are fairly easily administered. Research is available which compares the MYTH with both the ASI and the A/B scale. Matthews and Jennings (1984) correlated scores on the MYTH with those on the ASI and found a moderate association (r=.42), but also noted that a substantial minority of subjects were not classified similarly by the two measures. In general, the MYTH and the A/B scale have been found to be only weakly related. Parfenoff and Hanson (1989) reported the lowest correlations between the two instruments, with correlation coefficents of r=.09 between the total MYTH and total A/B score, r=.12 between the MYTH Impatience-Aggression and A/B Restlessness-Aggression factor scores, and r=.10 between the MYTH Competitiveness and A/B Leadership factor scores. Other

researchers have reported correlations between MYTH total scores and A/B total scores ranging from r=.21 to r=.27 (Kliewer & Weidner, 1987; Bishop et al., 1987; Hunter et al., 1985; Jackson & Levine, 1987). The greatest overlap between the two measures was reported by Kliewer and Weidner (1987) with a correlation of r=.32 between the Impatience/Aggression factor of the MYTH and the Restlessness/Aggression factor of the A/B scale. Bishop et al. (1987) and Jackson and Levine (1987) examined the percentage of subjects who received similar classifications on the MYTH and the A/B scale and found that the probability of receiving the same Type A or Type B classification from both measures was only slightly above the level of chance.

This lack of correspondence between the children's Type A measures mirrors that found in the adult literature between the SI and the JAS. Classification on the basis of the SI has been found to agree with that on the basis of the JAS at only 10-20% above chance levels (Matthews and Haynes, 1986; Evans, 1990). This discrepancy has generally been attibuted to the variations in format across the two measures, with the

SI assessing both response style and content and the JAS assessing only content. The weak relationship between the JAS and the SI has also been attributed to the fact that the Type A pattern is not a unitary concept but encompasses a number of behaviors that are emphasized to varying extents by different instruments (Bishop et al., 1987). These same factors are probably responsible for the lack of correspondence between the instruments used to assess Type A behavior in children.

The A/B scale was chosen to measure Type A behavior in the present study. The reasons are as follows. Although the MYTH has been used more extensively than the A/B scale, both scales have been validated against behavioral and physiological indices of Type A and their reliabilities are generally comparable. In addition, given the lack of longitudinal data which links either MYTH- assessed or A/B scale-assessed Type A behavior in children to coronary heart disease endpoints, researchers (Jackson & Levine, 1987; Bishop et al., 1987) have indicated that it is difficult to determine which measure provides the better assessment of Type A behavior. Finally, given

the need, in this study, to collect data on a large sample of children, it was considered more feasible to ask children to provide Type A information on themselves than to rely on teachers to fill out questionnaires on a substantial number of children in their class.

Behavioral Similarities between Type A Children and Type A Adults

Many characteristics displayed by Type A adults are also observed in Type A children. Matthews and Volkin (1981) demonstrated that Grade 4 Type A children out-performed their Type B counterparts in a task involving math problems with no explicit time deadline. Similar performances have been demonstrated by Type A adults on the same task (Burname, Pennebaker, & Glass, 1975). Matthews and Volkin (1981) also reported that, like Type A adults (Carver, Coleman, & Glass, 1976), grade 6 boys exerted a greater effort to excel than Type Bs at a fatiguing task while at the same time suppressing their fatigue. Additional evidence of the parallels between Type A adults and children was

reported by Matthews (1979): a comparison of efforts to control by Type A and Type B children and adults revealed that both Type A children and adults made more effort to control in a threatening environment than did their Type B counterparts; there was no difference between groups in the non-threatening situation. Type A adolescents also reported greater needs to maintain control than to Type B adolescents (Siegel, Matthews, & Leitch, 1981). The report by Matthews and Angulo (1980) that Type A children squirmed more and tended to be generally more restless and interruptive than Type B children parallels the kinds of behaviors displayed by Type A adults during the Structured Interview (Dembroski et al., 1978). Type A children have been found to be more impatient than Type Bs when confronted with a frustrating task and more aggressive during play (Matthews & Angulo, 1980). Type As also scored higher than Bs on measures of competition, achievement striving, time urgency, and anger (Siegel et al., 1981), and displayed more explosive and rapid speech styles (Siegel & Leitch, 1981; Wolf et al., 1982).

Physiological Reactivity in Type A Children

Evidence has been accumulating that atherosclerosis, coronary artery disease, and essential hypertension begin relatively early in life and are fairly stable over time (Webber, Cresanta, Voors, & Berenson, 1983). This has helped stimulate research into the developmental aspects of the Type A behavior pattern. Investigations of the physiological correlates of Type A behavior as developmental precursors to CHD have produced conflicting results. A number of researchers have reported no A/B differences on resting levels of heart rate and blood pressure (Murray, Matthews, Blake, Prineas, & Gillum, 1986; Eagleston et al., 1986; Lundberg, 1983; Matthews & Jennings, 1984). However, Jennings and Matthews (1984) found that boys scoring above the median on the MYTH had significantly higher heart rates at baseline than boys scoring below the median. It is noteworthy that this difference appeared in only one of the two samples included in the study.

While Lawler, Allen, Critcher, and Standard (1981) found that MYTH-assessed Type A children did not differ

from Type B children on resting systolic blood pressure (SBP), Bortner scale-assessed Type A children showed a trend towards higher resting SBP levels and significantly greater heart rate (HR) variability during baseline relative to comparably assessed Bs. Black boys who scored in the Type A direction on the A/B rating scale were found to have significantly higher SBPs in comparison to their Type B counterparts, while Type A white girls had significantly higher diastolic blood pressure (DBP) than their Type B counterparts (Hunter, Wolf, Sklov, Webber, Watson, & Berenson, 1982).

Children scoring in the top quintile on the eagerness-energy factor of the A/B Rating Scale have been found to have significantly higher levels of total cholesterol and triglycerides than those in the bottom quintile (Hunter et al., 1982). However, Matthews and Jennings (1984) did not find pulse measure variability to be differentially related to A/B status. Siegel, Matthews, and Leitch (1983) have reported that extreme-group Type A adolescents showed significantly more variability in SBP over an 8 month period than did

their Type B peers, and that a significantly higher peak SBP in As relative to Bs was mediated by body weight. Finally, Type A children reported higher levels of cardiovascular arousal (Siegel, 1982) and showed greater magnitudes in skin conductance responses (Lawler et al., 1981) but did not differ from Type Bs on measures of HR and BP in response to real-life stressors (Waldron et al., 1980).

A number of studies are available that look at physiological reactivity under differing levels of task challenge. Murray, Blake, Prineas and Gillum (1985) found no A/B differences on physiological measures of BP and HR during an arithmetic task. Lundberg (1983) reported significantly larger increases in SBP in Type As relative to Type Bs in a physically challenging condition, although no differences were evident in an emotionally challenging situation. Matthews and Jennings (1984) and Lawler et al. (1981) found differential variability in HR and BP in Type As relative to Type Bs depending on the method of assessment and the nature of the task employed. That is, using the Adolescent Structured Interview (ASI),

Matthews and Jennings (1984) found that Type A was associated with elevations in HR for a task requiring competition with oneself and elevations in BP when competing against an opponent. MYTH-assessed Type A behavior, on the other hand, was not found to be related to HR reactivity but was found to be associated with a significant decrease in DBP across the two competition tasks. Tasks measuring frustration/impatience did not produce any ASI-assessed A/B group differences on HR or BP, while MYTH-assessed Type A children were found to have significant increases in both SBP and HR for these tasks. Using the MYTH, Lawler et al. (1981) found that, for females but not males, Type As as compared to their Type B counterparts showed significantly greater increases in BP and HR in both a reaction time task and a verbal puzzle task. However, when the Bortner scale was used to assess Type A behavior, no significant group by sex interaction was found for BP or HR. Type As showed significantly larger HR responses in the verbal puzzle task but not the reaction time task, and no significant group differences were found for BP on either of the

two tasks. Jennings and Matthews (1984) demonstrated that Type As relative to Type Bs had greater anticipatory cardiac deceleration during a number of challenging conditions, but it was only when the task required continued performance and attention that Type As displayed a slower return to prestimulus heart rate levels relative to Type B children.

In summary, the literature concerning the physiological correlates of Type A behavior in children thus far provides equivocal support for a direct link to coronary disease. Interpretation of these findings must take into consideration the variability, both within and across studies, in the measures used to assess Type A behavior, how A/B status was determined (ie., using extreme groups versus a median split), and the nature of the tasks utilized. Two additional variables which have been shown to be worthy of consideration are gender (Lawler et al., 1981) and the size, and thus representativeness, of the sample studied. Overall, the literature appears to provide some preliminary support for the existence of differential physiological reactivity in Type A

children relative to Type B children which may, in turn, be associated with CHD development.

Stability of Type A Behavior

Thus far, only a few studies have addressed the issue of stability of the Type A behavior pattern from childhood to adulthood. The importance of looking at stability is underlined by the fact that it is the adult, not the child, pattern that to date has been shown to be predictive of CHD.

Steinberg (1985, 1986) examined the role of early childhood temperament in the development of adult Type A behaviors. He carried out follow-back studies of between 84 and 108 youngsters from middle and upper-middle class families participating in a longitudinal study on temperament and adjustment over the life cycle. While it was not the explicit purpose of the researcher to study Type A behaviors, variables related to Type A were measured and extracted from the existing data pool.

Factor analyses of the interview-derived data yielded factor clusters which were remarkably similar

to the components of the Type A pattern reported for more frequently-used measures. However, derived factors shifted with age and sex of the subjects. For males, young adult Type A behavior was predicted significantly by mothers' reports on temperament at 3-4 years of age (15% of the variance accounted for), while for females explained variance increased over time to a high of 25%. For males, behavioral components of Type A and overall Type A classification were stable over the period between adolescence and adulthood. Components of Type A were also stable for females between adolescence and adulthood, although Type A classification was not. However, components of Type A and overall classification in early childhood were not predictive of the same factors in adulthood for either sex. While these findings suggest some stability of Type A behavior from adolescence to adulthood and some lack of stability from childhood to adulthood, Steinberg cautions that these data should be considered in light of the unrepresentativeness of the sample's SES levels and the absence of standardized Type A measures.

One additional study investigated the stability of

Type A behavior from adolescence to adulthood also used data derived from a study not originally designed to look at the development of the Type A behavior pattern. Bergman and Magnusson (1986) investigated the relationship between four teacher-rated behavioral variables and later Type A behaviors in 170 Swedish children participating in a longitudinal study on individual development. Data on the four behavioral variables, aggression, motor hyperactivity, overambition, and over-achievement, were collected at age 13, while a Swedish Type A scale based on the JAS was administered at age 27 years. These investigators reported that aggression, motor hyperactivity, and overambition during adolescence were predictive of Type A status in adulthood for males, while only motor hyperactivity during adolescence was related to adult Type A status for females. These findings are consistent with those of Whalen and Henker (1986) which indicated that the constructs of Type A and Hyperactivity overlap.

Visintainer and Matthews (1987) have directly addressed the issue of stability of Type A behavior.

These researchers looked at MYTH ratings for 434 children (drawn from grades K, 2, 4, 6) collected 2 years and 5 years after initial testing. At the two year follow-up, MYTH test-retest correlations averaged $\underline{r}$=.38 (range $\underline{r}$=.33 to $\underline{r}$=.45), while at the 5 year follow-up the average MYTH rating intercorrelation was $\underline{r}$=.39 (range $\underline{r}$=.33 to $\underline{r}$=.46).

Together, these studies offer some support for the stability of Type A behavior, at least from adolescence to adulthood. Work by Visintainer and Matthews (1987) suggests that Type A behavior, assessed by a standardized measure, is somewhat stable during early childhood. Whether these behaviors persist unchanged into adulthood and are predictive of CHD still has to be determined.

Summary of Research on Type A Behavior in Children

The literature suggests that Type A is a meaningful construct in childhood. There are demonstrated behavioral similarities between Type A adults and Type A children, evidence that the underlying precursors to CHD have been shown to begin

in childhood, and support for differential physiological reactivity in Type A children relative to Type B children which may be associated with CHD development. As well, Type A behavior in children has been shown to be reasonably stable over time.

The biggest problem seems to involve overlap between the constructs of Type A and behavior problems in children. It may be that the overlap is only partial. Any social relationship problems that Type A individuals have may be due to their choosing to focus on task completion whatever the social cost rather than poor social skills. It may be that Type As have good social skills but forego social amenities when 'work needs to be done', and display aversive social behavior in the service of completing this 'work'. This is clearly different from the reasons behind the social difficulties that hyperactive and aggressive children experience. Thus, assessing the social behavior of Type A children should provide another point of comparison to evaluate the overlap between the constructs of Type A and behavior problems.

Rationale for the Present Study

Although there has recently been considerable controversy surrounding the Type A behavior pattern, in general evidence exists to support the greater risk of coronary heart disease for Type A individuals. Explanations of how Type A influences CHD development have focused on both physiological and psychological mechanisms. Due to the inherent difficulties of studying physiological mechanisms directly and the paucity of longitudinal data on psychological variables, much is still unknown about how the Type A behavior pattern is related to the development of CHD. A recent area of investigation which may help to clarify the link between Type A behavior and CHD has focused on the quality of social relationships of Type A individuals. Evidence suggests that Type A individuals experience high levels of stress. As well, the research indicates that Type A individuals have weaker relationships with significant others. Since social support has been known to ameliorate the effects of stress, it may be that higher levels of stress in conjunction with problematic social relationships

increases the likelihood of CHD development. It is also feasible that social support may act independently of the effects of stress and that individuals experiencing comparable amounts of stress may have a differential susceptibility to CHD depending on their level of social support. That is, low social support may hamper an individual's ability to cope with stress and this in turn may exacerbate CHD development.

How one behaves certainly influences the social support that one receives, but self-reported social support reflects only indirectly ones social competence and may provide only a partial description of the quality of an individual's social relationships. Consideration of the peer's perspective and naturalistic observations of behavior in the social environment should provide a more comprehensive view of social functioning. These variables are not independent of social support, since poor peer relations and anti-social interpersonal behavior are likely to be associated with diminished support.

Research focusing on the social relationships of adults is understandably limited since it is difficult

to gain access to information from these different sources. For this reason, it is much more feasible to study children since, in addition to self-reports, relevant data from peers and direct observation of behavior interactions are more readily available within the school setting. Therefore, this study will focus on children.

The purpose of the present study was to determine whether Type A children differ from Type B children on a number of measures of social functioning. More specifically, do Type A and Type B children differ in their levels of aggression and likeability as perceived by their peers? What do Type A and Type B children think of others around them in terms of availability of others for support and their perceptions of how supportive others are? Since this research was exploratory and since little is known about the play activities of Type A and Type B children in a naturalistic setting, this study also proposed to look at this aspect of social functioning. More specifically, this study examined the playground behavior of Type A and Type B children in terms of whom

they associated with, the gender of their playmates, the level of involvement displayed during play, the type of social activity engaged in at recess, the number of social initiations made toward others or that others made towards them, and the number of times interactions with others were terminated either by the target child or the target child's playmates.

Hypotheses

Peer Measures

1. Given the emphasis on aggression in the Type A construct, Type A children should be rated higher than Type B children on aggression by their peers (Van Egeren, 1979; Strube et al., 1985; Vega-Lehr & Field, 1986; Whalen & Henker, 1986).
2. Given the negative correlation between aggression and likeability (Virtue & French, 1984) and the negative correlation between Type A behavior and classmate-reported likeability (Kurdek & Lillie, 1985), Type A children should be rated lower on likeability by their peers than Type B children.

Social Support Measure

3. Given the lack of emphasis by Type A individuals on social relationships (Cohen, 1978; Dembroski & MacDougall, 1985) and the high levels of aggression associated with the behavior pattern, Type A children should report lower quantitative levels of support than Type B children.
4. Given the antisocial nature of their behavior (Vega-Lehr & Field, 1986; Whalen & Henker, 1986), Type A children should report lower qualitative levels of support than Type B children.

Observations of Social Behavior

Given the exploratory nature of this aspect of the study, specific predictions were not made for most of the behavioral observation variables. However, given that the available literature suggests that Type As are less cooperative than Type Bs (Van Egeren, 1979; Whalen et al., 1989), and that Type As are more aggressive than Type Bs (Whalen et al., 1989) specific predictions were made for these variables.

5. Type A children should display less cooperative behavior than Type B children.
6. Type A children should display more aggressive behavior than Type B children.

Method

Subjects

Two hundred and ninety-six children in grades 4 and 6 comprised the group from which children who participated in the present study were drawn. They were solicited from 5 Ottawa schools (see Appendices A and B for a copy of the letter sent to the parents describing the study and the consent form). Of these 296 subjects, 184 returned a consent form allowing them to participate. The remaining 112 children either did not receive permission to participate or did not return the consent letter. Five children, all from the same school, who did receive consent but who were absent during the testing sessions were also eliminated. Data from three additional subjects were excluded, two because of a poor understanding of English and one because the child was deaf and had a severe language delay which curtailed her ability to comprehend the questionnaires.

One hundred and seventy-six children in grades four and six served as subjects. There were 96 children in grade four (35 males and 61 females) and 80 children in

grade six (44 males and 36 females). They ranged in age from 9 to 14 years, with a mean of 9.4 years for the children in grade four and 12.1 for the children in grade 6. These 176 subjects completed a self-report measure of Type A, a peer nomination measure of Aggression, Withdrawal, and Likeability, and a self-report measure of Social Support. The social behavior of a subsample of this larger sample, consisting of 50 children, was also observed during school recess periods and lunch hours. Of the 50 children in the observational sample, 24 were in grade 4 (12 males and 12 females), and 26 were in grade 6 (13 males and 13 females). These children were chosen from three of the five schools. Children from these three schools were divided into 4 groups; females in grade 4, females in grade 6, males in grade 4, and males in grade six. Targets for observation were chosen randomly from these 4 groups.

Measures

Hunter-Wolf A/B Rating Scale. The Hunter-Wolf A/B Rating Scale (Wolf et al., 1982) is a self report measure consisting of 24 pairs of items rated on a 7 point scale (see Appendix C). The possible range of scores is thus 24 to 168. The scale has been found to load on 4 factors thought to be related to Type A behavior: they are eagerness-energy, restlessness-aggression, leadership, and alienaton (Wolf et al. 1982). An in-depth review of the psychometric properties of the Hunter-Wolf A/B Scale can be found in the introduction of this paper.

A total score was obtained by adding up the ratings for each item (see Appendix C for which items were reverse scored). Factor scores were not used for the following reasons. First, the present study was interested in categorizing subjects as Type A or Type B in order to investigate whether these children differed in their social behavior. Whalen, Henker, Hinshaw, and Granger (1989) have indicated that "the typical procedure for differentiating Type A from Type B youngsters relies exclusively on total rather than

subscale scores" (eg. Wolf et al., 1982; Kliewer & Weidner, 1987; Jose & Langer, 1989). Furthermore, a number of studies have been unsuccessful in replicating the factor structure of the A/B scale (Jackson & Levine, 1987; Bishop et al., 1987; Amos et al., 1987).

Pupil Evaluation Inventory (PEI). The Pupil Evaluation Inventory (Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976) is a peer nomination measure which loads on three orthogonal factors; aggression, withdrawal and likeability (see Appendix D). Of the 34 items scored, 20 load on the factor of Aggression which include such items as "Who tries to get other people in trouble?", and "Who starts a fight over nothing?". Nine items load on the Withdrawal factor, including "Who is too shy to make friends easily?, and "Who has very few friends?". Lastly, 5 items load on the Likeability factor, examples of which are "Who is liked by everybody?", and "Who is your best friend?".

Pekarik et al. (1976) reported 2-week follow-up test-retest correlations for factor scores of greater than .80, while Vogel, Cohen-Conger, and Phillips-Keane

(1985) found reliability coefficients of .70 for Withdrawal, .88 for Likeability, and .93 for Aggression over an 8 week period. Test-retest reliability reported by Johnston, Pelham, Crawford and Atkins (1988) ranged from .77 for Likeability to .82 for Aggression over an average of 16 weeks follow-up. A 3 year follow-up by Moskowitz, Ledingham and Schwartzman (1985) indicated moderate stability of factor scores. High internal consistency of factor scores (Johnston et al., 1988; Pekarik et al., 1976), good factorial stability, high male-female interrater agreement (Pekarik et al., 1976), and high inter-item reliability (Moskowitz et al., 1985) have also been reported.

A number of studies have provided evidence for the concurrent validity for the PEI. Pekarik et al. (1976) reported finding moderate concurrent validity for the PEI in comparison to teacher and peer ratings. Virtue and French (1984) correlated teacher ratings on the Child Behavior Rating Scale with peer ratings on the PEI. The Aggression score on the PEI correlated positively with teacher ratings of disability (r=.36) and aggression (r=.46), while the Withdrawal score

correlated positively with teacher ratings of disability (r=.53), low need for achievement (r=.55) and anxiety (r=.63). Likeability correlated negatively with teacher ratings of disability (r=-.63), low need for achievement (r=-.57), anxiety (r=-.38) and academic disability (r=-.44). Johnston et al. (1988) found modest correlations between the PEI and positive and negative sociometric nominations by peers; the correlation between positive nominations and the Likeability score was higher than the correlation between positive nominations and Aggression, and negative nominations were more related to Aggression scores than to Withdrawal or Likeability Scores. Ledingham, Schneider, and Byrne (1991) found high concordance between the PEI and the Revised Class Play (RCP) factor scores, with correlations of r=.85 between the PEI Aggression and RCP Aggression-Disruptive factors, r=.83 between the PEI Withdrawal and RCP Sensitivity-Isolation factors, and r=.82 between the PEI Likeability and RCP Sociability-Leadership factors.

Other studies have provided evidence for the predictive validity of the PEI. Ledingham and

Schwartzman (1984) looked at the ability of the PEI to predict school success and found that fewer aggressive/withdrawn and aggressive subjects were in a regular class at the expected grade level than withdrawn subjects or controls. The work of Weintraub, Prinz, and Neale (1978) provided further evidence of the sensitivity of the PEI to subtle signs of developing maladjustment in children with psychiatrically-ill parents.

The PEI yields three scores, one for Aggression, one for Withdrawal and one for Likeability. These were calculated by adding up the total number of nominations received for a given subject and dividing by the number of items that loaded on the factor. This score was then divided by the number of raters in the class minus one (self ratings were not scored). This procedure yielded a similar score for each factor that reflected the proportion of possible raters who nominated a given child for each item in the factor.

Children's Social Support Scale. The Children's Social Support Scale (CHISS) (see Appendix E), designed for this study, was based on a measure of social support developed for use with adults. After reviewing already existing measures of networks and social support (Brown, 1978; Hirsch, 1979; Tolsdorf, 1976; Lin, Dean, & Ensel, 1981; Sarason, Levine, Basham, & Sarason, 1983; Barrera, Sandler, & Ramsay, 1981; Holahan & Moos, 1983; Procidano & Heller, 1983), a scale was developed for adults that incorporated what were believed to be the most relevant variables which combined both objective and subjective aspects of social support. The objective measures included size of the network (the number of people identified as significant others), how often the subject was in contact with each member (access to or availability of significant others), the relationship with the subject (e.g. family member, peer), and how long each member of the network had been known (stability of the network). The subjective measure included a total of 42 items developed to tap the following aspects of social support: emotional satisfaction, physical support,

reciprocity, intensity, cohesiveness of network members, dependency on others, and predictability of available support.

The same principles were used for the development of the CHISS. Some of the questions tapping subjective aspects of social support were dropped due to their inappropriateness for children and additional items were added which were more relevant to children's experience and friendship expectations (eg., "My friends and I share secrets."; "I know that my friends will stand by me or stick up for me when someone else is giving me a hard time."). These items were based on studies of children's friendships (Ladd & Emerson, 1984; Bigelow, 1977; Bigelow & LaGaipa, 1980). Pilot testing involved having the scale read and filled out by children aged 9 to 11 and read by a teacher to check that the vocabulary and presentation were appropriate for children in this age range.

The total number of items generated was 31. Each item had a possible score of 1 to 4 for the subjective scale, where 1 indicated lowest support and 4 indicated highest support.

For the purposes of this study, the CHISS scale yielded two global support scores: Total Quantitative Support and Total Qualitative Support. Total Quantitative Support was calculated using the sum of the total number of people in the network, a mean weighted frequency score, and a mean weighted duration score.

The frequency variable (how often one sees the people who were named in the social network as important others) had four levels: everyday, 5-6 days a week, at least once a week, and less often than once a week. These levels were chosen since the answers that children typically gave fell into these categories. Since "everyday" represented the greatest frequency of contact, this level was given the highest weighting by multiplying it by 4. The next most frequent contact (5-6 days a week) was given the second highest weighting by multiplying it by 3, while 'at least once a week' and 'less often then once a week' were multiplyied by 2 and 1 respectively. The weighted frequencies for each social support source listed were then added together and divided by the total number of people listed in the

network to yield a mean weighted frequency score.

The duration variable (how long an individual in the social network had been known) had three levels: less than 1 year, between 1 and 5 years and more than 5 years. As with the frequency variable, these levels were chosen because the answers that children typically gave fell into these categories. Given that the children ranged in age from 9 to 14 years, "more than 5 years" was considered to be representative of a very long relationship for such youngsters. Since more than 5 years signified the most stable relationship, this category was given the highest weighting by multiplying it by a factor of 3. The remaining two categories, between 1 and 5 years and less than 1 year, were multiplied by factors of 2 and 1 respectively. The weighted duration scores for each social support source listed were then added together and divided by the total number of people listed in the network to yield a mean weighted duration score.

The Total Qualitative Support score was calculated by adding together the scores for each respective question in the qualitative section of the CHISS scale,

with some items reversed scored (see Appendix E). Items 4, 11, and 19 were not considered in the scoring since they were only included in the questionnaire for the purpose of detecting response bias.

The psychometric properties of the Children's Social Support Scale were examined using the data from the present study. Split-Half reliability as a measure of internal consistency was found to be high, yielding a Spearman-Brown coefficient of .85. Iteritem consistency was found to be acceptable with an Alpha coefficient of .83. A modified version of the qualitative support section of the CHISS was used by Vargo (1990). This 25-item scale yielded item-total score correlations ranging from $\underline{r}$=.335 to $\underline{r}$=.723, and test-retest reliability over a 12 week period of $\underline{r}$=.87. Support for the construct validity of the CHISS qualitative support index comes from Vargo's (1990) finding of a significant and negative association between social support and psychopathology.

Observational Coding Scheme. The observational coding system used in the present reseach (see Appendix F) included 18 categories which fell into four groups. One category from each group could be coded during each observational interval. The four groups were labelled Association, Level of Involvement, Type of Social Activity, and Social Initiations/Terminations.

The Association variables indicated who the target child was with: Alone, Teacher, Teacher and Peer, Male Peer, Female Peer, or both sexes. The Level of Involvement variables, coded during an ongoing activity or interaction with peers, were coded as either Watching, Medium, or Central, with Watching signifying the lowest level of involvement and Central the highest. The variables which comprised the Type of Social Activity category included Unoccupied/Motor (Unoccupied and Motor were combined because raters could not reliably distinguish between the two categories during training), Vocal, three Aggression variables (aggression initiated by the target child, aggression initiated by another child towards the target child, and aggression displayed by the target

child in response to being aggressed against by another individual), Rough and Tumble Play, and Cooperation. These social activities were conceptually arranged along a continuum, with Unoccupied/Motor depicting the least complex type of social activity. Vocal was conceptualized as being higher in social complexity than Unoccupied/Motor. Cooperation was conceptualized as the most complex social activity. Activity codes were assigned in an hierachical order; that is, if two behaviors were observed simultaneously, only the behavior presumed to be more complex or more social was coded. For example, if Vocal and Cooperation were both occurring at the time of the code signal, only Cooperation was coded. The final group of variables, making up the Social Initiations/Terminations category, included categories for initiation by the target, initiations by others, and terminations by the target or terminations by others.

Each subject received a total score for each of the observational variables. This score was a sum of the number of times a given variable was coded for a particular target child over the total 20 minutes of

observation collected for each child.

Observer Training. Three observers collected the observational data. Training was carried out over a period of seven months. The training included direct observation of children in a children's mental health center during recess, coding of children's social play from videotapes, and three weeks of direct observations just prior to data collection at two of the schools used in the present study. The criterion for ending training was a percent agreement score of at least 80% across all three observers over five consecutive days of observation. Percent agreement was calculated as: 100 X[(Agreements + Disagreements)/2(Disagreements)].

Reliability checks for pairs of observers were randomly distributed throughout data collection and occurred on 10.5% of all observations. They were arranged to ensure that all possible pairs of observers were evaluated. The data collected during reliability checks were included as data for the subject being observed by randomly choosing the coding of one observer.

Procedure

The PEI, A/B Scale, and CHISS were group administered in each classroom. Children who were absent during the class administration were later tested either in small groups or individually. All children filled out the questionnaires in the same order: the CHISS was completed first, followed by the A/B Scale and the PEI. Grade four students had the instrument read to them by the examiner.

The CHISS was completed by most children during the first day of testing, and the Hunter-Wolf A/B Rating Scale and the PEI were filled out during a second testing session. One grade 6 class and two grade 4 classes completed all of the testing in one testing session by request of their principal. Time between testing sessions was never more than one week.

The Children's Social Support Scale was prefaced by a brief explanation. The children were read the following passage:

> These questions have been put together to help us learn about what people are important to you. These people can include your family, friends (at school and in your neighborhood), teachers, and others. These people may be important to you for many reasons. Some of these reasons could be that

> you like to spend time with them, they help you with your homework, they let you know that what you have to say is important, and they give you good suggestions on how to solve problems.

For the A/B Scale, children were told that "each question had two sentences, one on the right hand side and one on the left hand side. Underneath the two sentences are numbers 1 to 7. To answer, you are to circle one of the numbers". This was then explained more explicitely with the aid of an example, and the meaning of each number (1 to 7) for that example was explained.

For the PEI, children were instructed to choose from a list those names they wished to nominate as best fitting each statement. Only the names of those children who had permission to participate in the study appeared on the list of names to choose from. Children were told that they could nominate up to four names for each statement.

Observations of social behavior were carried out on a subset of the total subject pool chosen randomly from three of the five schools. The children in these three schools constituted 64% of the total subject pool. These three schools were chosen because they were the

first three that the instruments were administered in, allowing ample time for observational data to be collected. Testing in the remaining two schools occurred quite late in the school year. In addition, since two weeks of the training of observers was carried out at two of the three schools in which observational data was collected, observers learned to identify the children quite readily, allowing for more expedient data gathering. This training period also appeared to reduce children's awareness of the observer's presence on the school play ground.

The order in which the subjects were observed was determined randomly within schools, with the exception that observations were obtained during all three recesses (morning, lunch, and afternoon) for each of the 50 subjects. A walkman was used to play a recording which indicated observation and coding periods. In this time-sampling technique, the target child was observed for five seconds. During a subsequent five-second period, the behavior that had occurred when the end of the observation period was signalled was recorded. Children were observed on each occasion for a total of

4 minutes. Overall, each child was observed on 5 separate occasions, yielding a total of 20 minutes of observations, or 120 distinct points of observation for each subject. In each 10-second observation interval, four different classes of behavior (Association, Level of Involvement, Activity, and Initiations/Terminations) could be coded. Appendix G contains the coding sheet used by observers.

The total A/B score was calculated for each subject by summing scores for all items on the Hunter-Wolf A/B Rating Scale (Wolf et al., 1982). Children were classified as Type A or Type B on the basis of a median split performed on the complete sample of 176 subjects[1]. The median score was 94. Scores of 95 or higher placed a child in the Type A group (N=85 for the complete sample, N=32 for the observational sample) and scores of 94 or lower placed a child in the Type B group (N=91 for the complete sample, N=18 for the observational sample.) The group of 85 children who scored above the median for the complete sample was composed of 42 males and 43 females, with 44 in grade 4 and 41 in grade 6. The 91 Type B children included 37

males and 54 females, with 52 in grade 4 and 39 in grade 6 (see Table 1).

Results

Table 2 shows the means and standard deviations for scores on the Hunter-Wolf A/B Rating Scale from the present study and from the published literature. Means and standard deviations for the Hunter-Wolf A/B Rating Scale are comparable to those reported in the literature. There appears to be a slight increase in mean Type A scores as the age of the sample increases. Research findings on the question of developmental changes are equivocal, with some studies reporting increases in Type A scores with age (Wolf et al., 1981; Hunter et al., 1985) while others report no age effects (Hunter et al., 1982; Manning et al., 1987; Weidner et al., 1988; Jose & Langer 1989). The present study found no significant effects of sex or grade on Type A scores, with $F(1,172)=.41$, $p>.05$ for sex, and $F(1,172)=1.32$, $p>.05$, for grade level.

Intercorrelations among all measures are presented in Tables 3, 4, 5. The pattern of correlations between total Type A scores, child social support, and peer nomination factor scores was similar across both the larger sample and the observational sample.

A chi square analysis was performed on the complete sample to determine whether boys and girls were proportionally represented in Type A and Type B groups. There were no significant differences, $\underline{X}^2(1,N=176)=1.39$, $\underline{p}>.05$, indicating that boys were no more likely to be categorized as Type A than were girls. An additional chi square analysis was carried out to determine whether children from grades 4 and 6 were evenly represented in the Type A and B groups. The results indicated no significant difference between the observed and expected frequencies, $\underline{X}^2(1,N=176)=.511$, $\underline{p}>.05$, indicating that the two grade levels were not significantly different in the number of Type As and Type Bs identified. Chi square analyses performed on the observational sample also indicated no significant sex differences in Type A/B identification rates, $\underline{X}^2(1,N=50)=0$, $\underline{p}>.05$, and no significant grade differences in the Type A/B identification rates, $\underline{X}^2(1,N=50)=.6433$, $\underline{p}>.05$.

Analyses were divided into two groups. The first group included those carried out on the complete sample of 176 subjects. A 2 X 2 X 2 Multivariate Analysis of

Variance (A/B Status by Sex by Grade) was conducted to determine whether Type As and Type Bs differed on peer-rated Aggression, Withdrawal, and Likeability or on self-reports of Total Quantitative and Total Qualitative Support.

The second set of analyses was conducted on a subsample of 50 subjects, the observational sample. For the observational sample, hypotheses concerned Type A/B differences on social behavior. Four separate 2 X 2 X 2 Multivariate Analyses of Variance (A/B Status by Sex by Grade) were conducted to determine whether Type As and Type Bs differed with respect to their companions during free play, in the gender make-up of their peer group, level of involvement during play, or activity engaged in.

The Bonferroni procedure was used to control for experimentwise error rate, partitioning the overall alpha level to yield an alpha level set at .05 among the univariate F-tests and stepdown analyses (Bray & Maxwell, 1982).

Issues concerning the treatment of missing data and testing the underlying assumptions to MANOVAS are

addressed in Appendix H.

Analyses of Peer and Self Ratings of Social Behavior

In order to determine whether Type A children were different from Type B children on measures of social behavior, a 2 X 2 X 2 between subjects Multivariate Analysis of Variance (A/B status by Sex by Grade) was performed on five dependent variables: PEI factor scores of Aggression, Withdrawal, and Likeability and the Children's Social Support Scale scores of Total Qualitative and Total Quantitative Support. The MANOVA, using a harmonic mean adjustment for unequal ns (Winer 1971; Milligan, Wong & Thompson 1987; Tabachnick & Fidell 1989), indicated a significant main effect for Group (A/B Status), $F(5,164)=3.4264$, $p<.01$, a significant main effect for Sex, $F(5,164)=5.5593$, $p<.001$, and a significant Grade by Group (A/B Status) interaction effect, $F(5,164)=2.3386$, $p<.05$. Univariate F-tests were included in the procedure to clarify the significant MANOVA findings (Tabachnick & Fidell 1989).

Univariate F-tests revealed a significant effect of A/B Status on peer-rated Aggression, $F(1,168)=6.5755$,

$p<.01$, with Type A children having significantly higher peer-rated Aggression scores than Type B children. A significant effect of A/B status on Total Qualitative Support was also found, $F(1,168)=10.1564$, $p<.01$, with Type A children reporting significantly lower levels of Qualitative Support than Type B children. There was no significant effect of group on peer-rated Likeability ($F(1,168)=3.9768$, $p<.05$, peer-rated Withdrawal ($F(1,168)=2.9762$, $p>.05$), or Total Quantitative Support ($F(1,168)=.0044$, $p>.05$). Table 6 presents the summary statistics for these measures as a function of A/B Status.

Univariate F-tests revealed a significant effect of Sex on peer-rated Aggression, $F(1,168)=9.2962$, $p<.01$, with males receiving significantly more nominations on Aggression from their peers than females. A significant effect of Sex was also found on Total Quantitative Support, $F(1,168)=7.5920$, $p<.01$, with females reporting higher levels of support then males. The effect of Sex was not significant for peer-rated Likeability ($F(1,168)=3.3077$, $p>.05$), peer-rated Withdrawal ($F(1,168)=3.8403$, $p>.05$, or Total Qualitative Support

($F(1,168)=1.9440$, $p>.05$). Table 7 presents summary statistics on these measures as a function of sex.

Univariate F-Tests revealed a significant Grade by A/B Status Group interaction effect on Total Quantitative Support, $F(1,168)=7.8490$, $p<.01$, portrayed in Figure 1. There was no significant Grade by A/B Status interaction effect for peer-rated Aggression ($F(1,168)=.1873$, $p>.05$), peer-rated Likeability ($F(1,168)=.0285$, $p>.05$), peer-rated Withdrawal ($F(1,168)=2.1188$, $p>.05$), or Total Qualitative Support ($F(1,168)=1.5848$, $p>.05$).

Simple effects were analyzed in order to clarify the interaction effect. While Type A children's scores did not differ at the two grade levels, Type B children had significantly higher Total Quantitative Support scores in grade 6 than in grade 4, $F(1,172)=5.03$, $p<.05$ ($X=18.036$, $X=16.504$, respectively). Type B children had scores similar to Type A children in grade 4 ($X=16.64$ and $X=17.05$, respectively), but had significantly higher Total Quantitative Support scores in grade 6 than did Type A children, $F(1,172)=3.76$, $p<.05$ ($X=18.036$, and $X=16.638$ respectively).

Analyses of Observations of Social Behavior

The Total Frequency, Mean, Standard Deviation and the Kappa statistic for each observational variable are indicated in Table 8. According to Fleiss (1981), Kappa values greater than .75 may be taken to represent excellent agreement beyond the level of chance, values between .75 and .40 may be taken to represent fair to good agreement, and values below .40 may be taken to represent poor agreement. Kappa coefficients for Aggression, Target Terminates and Other Terminates were not calculated because of the very low frequencies of these categories. Since the Kappa coefficients for Aggression and the Social Initiation/Termination variables could either not be calculated or were very low, and since these behaviors occurred very infrequently, the categories were not included in further analyses.

Kappa levels were acceptable for Rough and Tumble Play, Teacher, Teacher plus Peer, and Opposite Sex Peer Group observational categories. However, the low frequency of occurrence of these variables brings into question the stability of the data. The percentage of

subjects who had zero scores on these variables ranged from 42 to 90%. These variables were also eliminated from subsequent analyses.

Kappa levels for Central and Medium were acceptable. However, these two categories were collapsed because, even though the Kappa for the Central category of .58 was acceptable according to Fleiss's (1981) criterion, the usefulness of this category was considered questionable because of the relative low frequency of occurrence and the extreme skewness of the distribution. Moreover, examination of the raw data indicated that 100% of the disagreements between raters for these two categories involved one rater choosing Central and the other choosing Medium. The Total Frequency for Medium/Central was 3717, with a mean of 74.34, a standard deviation of 24.46 and a Kappa coefficient of .80.

To address the question of whether Type As and Type Bs differed on whom they associated with during free play, a 2 X 2 X 2 Multivariate Analysis of Variance (A/B Status by Sex by Grade) was carried out on the variables Alone and Peer. The MANOVA, using Pillais'

criterion (which is considered to be more robust for small samples with unequal ns, Tabachnick and Fidell, 1989)[2] and a harmonic mean adjustment for unequal ns, indicated a significant effect for Grade level, $F(3,40)=2.8468$, $p<.05$. No other significant main effects or interaction effects were found.

A stepdown analysis was included in the procedure to clarify the significant MANOVA findings. According to Tabachnick and Fidell (1989), a stepdown analysis is appropriate as a posthoc analysis to MANOVA when correlations among the dependent variables exceed $r=.30$. As required by stepdown analysis, an additional assumption must be tested. The test for homogeneity of regression was non-problematic, $F(6,36)=1.59$. $p>.05$. In order to do a stepdown analysis, the dependent variables have to be prioritized with the highest-priority dependent variable tested in univariate ANOVA and the remaining dependent variables tested in a series of ANCOVAS. Alone was entered into the analysis before Peer because the pattern in the Univariate Fs suggested that only Alone was contributing to the variance in the independent variable of Grade Level.

The stepdown analysis indicated that Alone made a unique contribution to predicting the main effect of Grade Level, $F(1,42)=6.7009$, $p<.05$, with children in grade 4 having significantly higher scores on Alone (X=21.58) than children in Grade 6 (X=12.46). The Peer variable did not contribute significantly to predicting the Grade effect, $F(1,41)=.0014$, $p>.05$ (see Table 9).

To address the question of whether Type As and Type Bs differed in their preference for the gender of the child or children they associated with during free play, a 2 X 2 X 2 Multivariate Analysis of Variance (A/B Status by Sex by Grade) was carried out on the variables Same Sex Peer and Mixed Sex Peer. The assumptions of normality, linearity and homogeneity of variance-covariance were found to be non-problematic. The Pearson correlation coefficient between the Same Sex group and Mixed Sex group variables was $r=-.68$, indicating that multicollinearity was not violated. The MANOVA, using Pillais' criterion and a harmonic mean adjustment for unequal ns, indicated no significant main or interaction effects at the multivariate level.

In order to address the question of whether Type A and Type B children differed in their level of involvement during free play, a 2 X 2 X 2 MANOVA was performed on the dependent variables Watching and Medium/Central. Results of the evaluation of assumptions of normality, homogeneity of variance-covariance, and linearity were satisfactory. Multicollinearity was violated with a Pearson correlation coefficient between Watching and Medium/Central of r=-.93.

With the use of Pillais' criterion and a harmonic mean correction for unequal ns, the combined dependent variables were significantly affected by Grade Level, $F(2,41)=4.9227$, $p<.05$, and the interaction of Grade Level and Group, $F(2,41)=4.4130$, $p<.05$. To investigate the significant MANOVA effects, a stepdown analysis was performed. Watching was chosen as the highest-priority dependent variable because it represented a purer measure of Low involvement than Medium/Central did of high involvement.

Results of the stepdown analysis are summarized in Table 10. The stepdown analysis indicated that Watching made a unique contribution to predicting the interaction effect of A/B status by Grade, $F(1,42)=6.3184$, $p<.05$, n =.01. The Medium/Central variable did not contribute significantly to predicting the interaction effect. Simple effects were analyzed to clarify the interaction effect on watching scores. While Type A children's scores did not differ at the two grade levels, Type B children had significantly higher watching scores in grade 4 ($\bar{X}=38.80$) than in grade 6 ($\bar{X}=19.75$), $F(1,46)=7.96$, $p<.01$, (see Figure 2). Type B children had scores similar to Type A children in grade 6 ($\bar{X}=19.75$ and $\bar{X}=26.667$, respectively), but had significantly higher watching scores in grade 4 than did Type A children ($\bar{X}=38.80$ and $\bar{X}=27.286$, respectively) $F(1,46)=3.82$, $p<.05$.

A 2 X 2 X 2 MANOVA was performed on the dependent variables Unoccupied, Vocal, and Cooperation. Results of the evaluation of assumptions of normality, linearity and homogeneity of variance-covariance were non-problematic. Pearson correlation values were $r=.54$,

r=-.85, and r=-.79 between unoccupied and vocal, unoccupied and cooperation, and vocal and cooperation respectively, which indicated that the assumption of multicollinearity was not violated. With the use of Pillais' criterion and a harmonic mean correction for unequal ns, the combined dependent variables were significantly affected by Grade Level, $F(3,40)=7.4508$, $p<.001$. There were no other significant main effects or interaction effects.

To investigate the impact of the main effect of Grade Level on the individual dependent variables, a stepdown analysis was run given the high correlations between the dependent variables. The test for homogeneity of regression was non-problematic. The dependent variables were ordered so that Cooperation was given the highest priority in the analysis, followed by Vocal and then Unoccupied. The rationale for this ordering was that Cooperation had the highest reliability coefficient (Kappa=.92 compared to Kappa=.74 and .67 respectively for Vocal and Unoccupied) and that Cooperation was also the most frequently occurring variable of the three.

The stepdown analysis indicated that, with differences due to Cooperation already entered, Vocal made a unique contribution to predicting differences between children in Grade 4 and in Grade 6. $F(1,41)=15.4443$, with children in Grade 4 having lower scores on Vocal (mean adjusted vocal=19.19) than children in Grade 6 (mean adjusted vocal=27.44). However, the univariate F for Vocal did not reach significance. The results of these analyses are summarized in Table 11.

Discussion

The present study sought to compare Type A and Type B children on a number of measures of social functioning. While Type A children were perceived by their peers to be more aggressive than Type B children, Type A and Type B children did not differ significantly on how likeable their peers perceived them to be. However, Type A children in comparison to their Type B counterparts reported that they receive less social support from others and, at least for older Type A children, that others are less available for support. Generally, the behavioral differences between Type As and Type Bs were not striking.

Consistent with other studies, the present study found that Type A scores were not dependent on sex or grade level. This suggests that level of Type A does not increase with age (Manning et al., 1987; Jose & Langer, 1989) and that boys are not more likely to receive higher scores than girls (Weidner et al., 1986; Weidner et al., 1988; Wolf, et al., 1979). However, a few studies have reported that Type A scores increase with age (Hunter et al., 1985; Amos et al., 1987) and that boys respond significantly more in the Type A direction than girls (Bishop et al., 1987).

Whether or not there are developmental changes in Type A behavior over time is unclear. However, it is noteworthy that the studies that reported increases in Type A scores over time employed a wider age range and older subjects (i.e., 8 to 17 years). On the other hand, those studies that failed to find an increase in Type A scores with age, including the present study, looked at a narrower age range and younger subjects. It may be that increases in Type A scores only occur in the teenage years. An increase in Type A behavior over time would be consistent with a conceptualization of this behavior pattern as a coping strategy learned over time to deal with stress (Hunter et al., 1985).

The present study lends support to the existing literature which by and large indicates that there are no substantial sex differences in Type A behavior. Manning et al. (1987) have suggested that the lack of sex differences in Type A behavior reflects changes in the treatment of girls which emphasize sexual equality and engender aspirations for the type of occupational success that males have typically been socialized to pursue. Therefore, we may be more likely to see levels of aggression and leadership behavior in girls that are comparable to those of boys than were observed in the past.

The fact that Type A children were found to have significantly higher peer-rated aggression scores than Type B children is consistent with the behavior of both Type A adults, as observed in analogue studies (Van Egeren, 1979; Strube et al., 1984; Holmes & Will, 1985), and Type A children in the laboratory, the classroom, and on the playground (Vega-Lehr & Field, 1986; Matthews & Angulo, 1980). These latter studies of children compared Type As and Type Bs on specific aggressive behaviors such as punishing an opponent more often, interrupting others' play, or aggressing against a Bobo doll. However, the findings of Whalen and Henker (1986) and Whalen et al. (1989) are more directly comparable with those of the present study since they looked at how Type A children are perceived by others. Type A children were reported in these studies to be trouble-makers by both their peers and program staff, and to be aggressive by program staff. While being a trouble-maker is not itself a measure of aggression, items tapping trouble-making have been found to be associated with measures of aggression (Pekarik et al., 1976).

Whalen and Henker (1986) and Whalen et al. (1989) studied small samples of children, predominantly males, some of whom were hyperactive. These studies did not

provide information on how others perceive Type A girls since only two girls were included in one of the samples. Given the atypical nature of the sample (a small and mostly clinical sample of children in a summer enrichment program), the generalizability of the results may also be questionable. The present study goes beyond these data to provide information about peers' perceptions of Type A girls as well as boys. In addition, the larger sample size and the use of children from a mainstream school population leads one to be more confident about the generalizability of these findings.

Although the difference between Type A and Type B children on peer-rated likeability was not significant, findings were in the expected direction, with Type A children receiving slightly lower scores on peer-rated likeability than Type B children. The finding that Type A children are not perceived by their peers as significantly less likeable than Type B children is surprising since Type As are known to be particularly aggressive and to have negative interactions with others. This finding is inconsistent with those reported by Kurdek and Lillie (1985), who reported that classmate likeability scores for boys were negatively associated with their Irritability factor scores on the

MYTH. It is also inconsistent with the findings of Whalen and Henker (1986) and Whalen et al. (1989), which indicated that boys high on the Impatience/Aggression factor of the MYTH were perceived as less 'fun to be with' by their peers. The description 'fun to be with' is similar to those items used in sociometric measures to determine a child's peer acceptance. The present study differed from these latter two studies in that the A/B scale was used here to measure Type A; Kurdek and Lillie (1985) and Whalen et al. (1989) both used the MYTH.

Jose and Langer (1989) found that teacher-assessed social skills were positively related to the Leadership/Competitiveness factor of the MYTH and negatively related to the Impatience/Aggression factor. Kurdek and Lillie (1985) also found that the Leadership factor of the MYTH was positively correlated with being well liked by classmates. However, associations of total MYTH scores with peer likeability and peer ratings of 'fun to be with' were not significant either in the Kurdek and Lillie (1985) study or for the normal controls in the Whalen and Henker (1986) study. The failure of total Type A scores to correlate with likeability is consistent with the findings of the present study. It seems as though certain

characteristics of the Type A behavior pattern are not perceived negatively by peers. It thus appears that not all Type A children will be disliked by their peers, but rather only those who are classified as Type A because of a high score on the more disagreeable component of the behavior pattern. This points to the problem of heterogeneity with the Type A construct. Not all Type A components are related to poor outcomes. This is consistent with the adult literature which has found that the job involvement component of the Type A behavior pattern may in fact be protective (Dembroski et al., 1978), while the hostility/anger/cynicism component seems to be most pathognomic (Dembroski et al., 1985; Dembroski & Costa, 1987).

The hypothesis that Type A children would report lower qualitative levels of support than Type B children was confirmed. This is consistent with the perceptions of Type A adults reported by Suls et al. (1981) and Waldron et al. (1980). More recent work with adults has also found that Type A scores are inversely related to degree of satisfaction with available support (Lynch & Schaffer, 1989) and to the extent to which others are seen as good listeners and can be relied upon when help is needed (Greenglass, 1988).

The hypothesis that Type A children would report lower levels of quantitative support than Type B children was partially confirmed. While Type A children in grade 4 did not differ from Type Bs in grade 4 or Type As in grade 6 in their reports of how available others were to them for support, Type B children in grade 6 reported that others offered more support to them than did Type Bs in grade 4. When one considers the negative behavioral characteristics and the apparent lowered social interest associated with the Type A behavior pattern, it is reasonable to expect that others would be alienated. The emergence of a difference between Type As and Type Bs occurring only at the higher grade level can perhaps be explained by developmental changes in the nature and importance of friendships.

As children get older, their social world expands. Peer contact has been found to increase with age (Hartup, 1983) as has the number of members in a child's social network (Feiring & Lewis, 1989). In addition, according to Furman (1989), a shift occurs between the ages of 9 to 12 years in the nature of relationships among children. The need for intimacy or friendship, usually with a same-sex age mate, becomes more important. For the first time, this relationship

reflects a sensitivity to the needs of the other person, allowing for the development of a genuinely interdependent relationship. The difference between the older Type As and Type Bs on quantitative support may be due to the failure of Type As to make the shift that Furman (1989) refers to. We know that Type A individuals lack affiliative tendencies (Dembroski & MacDougall, 1978), are unaware of social cues (Cohen, 1978), and, as indicated by the findings of this study, are perceived as aggressive by their peers. It is unlikely that Type As would be as sensitive to the needs of others or that they would develop genuine interdependent relationships since they tend not to be very cooperative, prefer to rely on themselves, and prefer to do things on their own without the help of others in order to maintain control (Suls et al., 1981; Miller et al., 1985). This characterization of Type As is consistent with the findings of Kurdek and Lillie (1985) that Type A children scored lower than Type B children on measures of friendship understanding and perspective taking. Therefore, it is not surprising that Type A children do not report the same increase in quantitative support as Type B children and that older Type B children report having significantly more people available to them than do their Type A peers.

This study did not provide longitudinal data on quantitative support. Thus one cannot conclude that Type A children's level of quantitative support remained the same over time while that of Type B children increased. However, the data do suggest that the availability of others for support is different for Type A and Type B children at older ages.

In contrast to the present results, the literature looking at the relationship between the Type A behavior pattern in adults and the availability of others for support suggests that Type As and Type Bs do not differ on quantitative measures of support. Suls et al. (1981) found that Type As and Type Bs did not differ significantly in the number of good friends reported, and Lynch and Schaffer (1989) found no differences for Type As and Type Bs on the number of social supports available to them. There are two plausible explanations for the lack of significant differences between Type A and Type B adults on quantitative support variables. First, both Suls et al. (1981) and Lynch and Schaffer (1989) used the JAS to assess Type A behavior. Since the JAS is not the optimal measure of hostile and aggressive aspects of the Type A behavior pattern (Dembroski & Williams, 1989), it may be that this measure is not identifying those individuals whose

behavior has the strongest negative impact on others. Consequently, JAS-identified Type As may not experience the same level of relationship problems. One problem with this explanation is that, if JAS-identified Type As are less aggressive than other Type As and their behavior has less of a negative impact on others, it is not clear why Suls et al. (1981) and Lynch and Schaffer (1989) found that Type A individuals reported lower levels of qualitative support. However, Cohen and Matthews (1987) have also pointed out the importance of considering the stability of support over time. This is particularly relevant to these two studies because they both used university students as subjects. It may be that the networks of these subjects were less stable as a result of moving away from home and establishing new ties, thus reducing the range of the variable on this sample. Therefore, a college population may not be the most appropriate subject group in which to investigate whether Type A and Type B subjects differ on measures of quantitative support.

The hypothesis that Type A children would display less cooperative behavior than Type B children was not confirmed. One possible reason for the lack of differences between Type A and Type B children on cooperative behavior was the fact that competitive

activities were coded as cooperative behaviors in this study because they involved children working together in a coordinated activity. Possibly a difference between Type As and Type Bs would have emerged if a distinction between cooperation and competition had been made. It is also possible that the sample size used for the observational part of the study was too small to generate sufficient power to test the hypothesis adequately.

The hypothesis concerning the observationally-determined level of aggression of Type A and Type B children could not be tested due to the overall low frequency of occurrence of this behavior. It is interesting to note, however, that, of the 6 instances of aggression that were coded, 5 were committed by Type A children. This is consistent with other research which suggests that Type As are more aggressive than Type Bs (Van Egeren, 1979; Vega-Lehr & Field, 1986). Whalen et al. (1989) found Type A children to behave more aggressively in the classroom and on the playground. The literature in general suggests that Type As are more aggressive than Type Bs; however, there remains a paucity of behavioral data to support these findings.

Overall, the behavioral differences between Type As and Type Bs were not striking. The low frequency of occurrence for a number of variables precluded testing differences between Type As and Type Bs on these behaviors. One has to consider the possibility that the sample size, although relatively large in comparison to most observational studies, perhaps did not provide ample power to test the hypotheses. Therefore, the lack of behavioral findings should be interpreted cautiously.

A number of studies have found that, at least using the MYTH, Type A behavior is associated with behavior problems in children (Bachman, Sines, Watson, Lauer, & Clarke, 1986; Hunter et al., 1985; Whalen & Henker, 1986; Whalen et al., 1989). The possibility that this overlap may reflect shared method variance has been raised because teacher-assessed Type A behavior, but not self-assessed Type A behavior, has been found to be related to teacher-assessed hyperactivity (Hunter et al., 1985). However, Whalen and Henker (1986) and Whalen et al. (1989) found moderate to strong relationships between MYTH scores and behavior problem scores assessed by different types of raters, with the Impatience-Aggression factor score making the largest contribution to the association

between total MYTH scores and various measures of behavior problems (Whalen et al., 1989). These authors suggest, on the basis of these findings, that there is too much overlap between measures of hyperactivity and Type A behavior to warrant consideration of Type A in childhood as a distinct construct. Type A children in this study also appeared to be very similar to other children with externalizing behavior problems. That is, like hyperactive or conduct disorder children, they were perceived as aggressive (Loney & Milich, 1982). While hyperactive and aggressive children have been found to be less well liked by peers (Johnston, Pelham, & Murphy, 1985; Johnston et al., 1988; Virtue & French, 1984), this study found that Type A children were not significantly less well liked by their peers than their Type B counterparts, although the findings were in the expected direction, with Type As receiving slightly lower likeability scores overall than Type B children. Therefore, Type A children do bear some similarities to other children with behavior problems. It may be that patterns of aggression and lack of peer acceptance in childhood are associated with a number of poor outcomes in later life; in some people this may result in poor social adjustment or delinquency, while in others it may result in cardiovascular disease.

It should be noted that, unlike hyperactive and aggressive children who do poorly academically (Lambert, Hartsough, Sassone, & Sandoval, 1987; Ledingham & Schwartzman, 1984), Type A behavior has been found to be positively correlated with academic achievement (Bachman et al., 1986). Children chosen as Type A on the basis of high achievement striving may not be at risk for poor outcomes in adulthood.

If it is the negative component of the Type A pattern that is pathognomic, then the Type A measures for children would not be expected to be tapping behavioral variables that are strikingly unique. For example, the item on the MYTH, "Can't sit still long" is quite similar to "Restless, alway up and on the go" which is one item commonly used to assess hyperactivity (Whalen & Henker, 1986) and the same as "Who can't sit still?" used on the Aggression factor on the PEI. It may be that this is not just an issue of construct confusion but that we are identifying behavioral characteristics such as hyperactivity and aggression that predict generally poor outcomes of many kinds. Clearly, more work needs to be done to clarify the extent to which Type A children are similar to and different from other children with behavior problems.

Implications of the Present Study:

Type A children were perceived to be more aggressive by their peers than Type B children. While Type As were not perceived to be less likeable than Type Bs, the trend was in the expected direction. If, as the literature suggests, Type A is a learned pattern of behavior and increases over time, it may be that stronger displays of the behavior pattern as these children get older may result in Type As being less likeable than Type Bs. Certainly, peers are already noticing some of the negative aspects of these children's behavior and they may become less tolerant of them as time goes on. Aggressive behavior is less prevalent as children get older (Coie, Christopoulos, Terry, Dodge, & Lochman., 1989), suggesting that this behavior is less tolerated at older ages. Of course, a shift in peer perception of Type As would depend on whether Type As display more competitive and leadership behaviors or more aggressive and impatient behaviors, since the former behaviors seems to be viewed more positively by others than the latter. The importance of the heterogeneity of behaviors classified as Type A for peer acceptance needs to be investigated further. We do know that some social differences between Type As and Type Bs seem to increase with age, as indicated by the

reporting of higher levels of quantitative support by Type Bs in grade 6.

The present study also indicated that Type A children perceive others as less supportive and less available to them, at least at older ages, in comparison to Type B children. This is likely due to the ramifications of their aggressive behavior and the fact that Type As do not place very much importance on others and minimize the value of the support they offer. This may in turn lead to decreased support from and availability of others, and leave the Type A individual vulnerable to the effects of stress, unbuffered by good social support.

Two recent studies have looked at the association between Type A behavior, social support, and CHD endpoints in adults, while a third has also examined the role of stress. Seeman and Syme (1987) found that, while social network measures were not related to the extent of atherosclerosis, perceived support and feelings of being loved were inversely related to the degree of coronary atherosclerosis. Type A behavior was not found to be directly associated with social support or to alter the relationship between social support and coronary atherosclerosis. Blumenthal, Burg, Barefoot, Williams, Haney, and Zimet (1987) found no differences

between Type As and Type Bs in the level of social support and no significant association between social support and coronary heart disease. However, a significant interaction effect was found such that the level of coronary artery disease decreased for Type As as the level of social support increased, suggesting that social support may attenuate the long-term negative health consequences of the Type A behavior pattern. Orth-Gomer and Unden (1990) found lack of social integration to be an independent risk factor for mortality in Type A but not Type B men. Stress was not found to be related to mortality or to interact with Type A status or social integration. While the findings of these studies are not consistent, they do suggest that the interplay of Type A behavior and social support may be important for understanding CHD risk and general health outcome in adulthood.

Limitations of the Present Study and Directions for Future Research:

One important limitation of the present study was that, because of its unstable factor structure, the A/B scale did not lend itself readily to an investigation of the relationship between different aspects of the Type A behavior pattern and measures of social

functioning. It seems likely that Type As scoring high on items measuring aggression, anger, and disruptiveness would have appeared quite different on measures of social functioning than those scoring high on items measuring leadership, competitiveness, and need for achievement. A similar issue concerns the measure of social support used. While this study did differentiate between quantitative and qualitative measures of support, the qualitative measure included many different aspects of support (ie., for example, emotional support, reciprocity, and instrumental support). This is problematic in that we don't know whether some of these aspects are more important in differentiating Type As from Type Bs, and which aspect is most related to negative long-term outcome. Future research should explore whether different components of Type A and social support have greater predictive value for later adjustment and health.

A final limitation of this study was that our understanding of the nature of the relationships of Type A and Type B children was largely based on reports by others and not on actual behaviors. In fact, there is very little data on the actual behavior of Type A and Type B children or adults in the natural environment, and this situation limits our

understanding of the Type A construct. Until we know how Type As and Type Bs differ in actual behaviors, we have only limited knowledge of the general significance of these differences.

The value of a theory which proposes that the link between Type A and CHD is mediated by social support and follows a developmental path from childhood to adulthood is dependent on knowledge of the stability of both Type A behavior and social support over time. Therefore, future research must focus on longitudinal investigations of these variables and their relationship to each other and to CHD in order to determine the usefulness of the proposed theory.

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Table 1

Group Size and Sex for Type As and Type Bs for the Complete and Observational Samples.

	Complete Sample			
Status	Grade 4		Grade 6	
	Males	Females	Males	Females
Type A	19	25	23	18
Type B	16	36	21	18

	Observational Sample			
Status	Grade 4		Grade 6	
	Males	Females	Males	Females
Type A	6	8	10	8
Type B	6	4	3	5

Table 2

Means and Standard Deviations of Type A/B Scores from the Hunter-Wolf A/B Rating Scale for the Complete Sample in the Present Study and for Samples Reported in the Literature.

			Type A/B Score			
			Males		Females	
Sample	N	Age	Mean	SD	Mean	SD
Present Sample	176	Grades 4&6	94.59	11.86	93.00	11.39
Jose & Langer (1989)	198	Grades 3-7	95.05	-----	90.64	-----
Weidner et al., (1988)	122	7-17 years	96.03	10.20	96.00	12.00
Thoresen et al., (1988)	184	Grades 5-9	98.4	13.00	98.50	12.50

Table 3

Intercorrelations among Measures for the Complete Sample.

	A/B Total	Agg.	Withd.	Like.	Qual.	Quant.
A/B Total	1.00	.26***	-.09	-.10	-.19**	.04
PEI Aggression		1.00	.07	-.24***	-.04	.04
Withdrawal			1.00	-.08	-.20**	.02
Likeability				1.00	.21**	.23***
CHISS Qualitative Support					1.00	.09
Quantitative Support						1.00

p<.05*
p<.01**
p<.001***

Table 4

Intercorrelations among Measures for the Observational Sample

	A/B Total	Agg.	Withd.	Like.	Qual.	Quant.
A/B Total	1.00	.44***	.04	-.08	-.44***	.22
PEI Aggression		1.00	.01	-.24*	-.14	.04
Withdrawal			1.00	-.35**	-.10	-.20
Likeability				1.00	.33**	.25*
CHISS Qualitative Support					1.00	-.15
Quantitative Support						1.00

p<.05*
p<.01**
p<.001***

Table 5

Correlations of Observational Measures with A/B Total scores, PEI Aggression, Withdrawal, and Likeability Factor scores, and CHISS Qualitative and Quantitative Support scores

	A/B Total	Agg.	Withd.	Like.	Qual.	Quant.
Variables						
Alone	-.09	-.05	.20	-.16	.00	-.17
Peer	.09	-.05	-.36**	.07	-.09	.35**
Same Sex	.07	-.19	-.13	-.01	-.13	.28*
Mixed Sex	-.07	.13	-.14	.05	.15	-.11
Watching	-.24*	-.16	.23	-.11	.00	-.25*
Medium/ Central	.25*	.23	-.23*	.10	.02	.17
Unoccupied	-.22	-.26*	.19	-.04	-.04	-.03
Vocal	.03	-.11	.15	.03	-.16	.32**
Cooperation	.16	.19	-.21	.04	.09	-.05

p<.05*
p<.01**
p<.001***

Table 6

ANOVA Summary Statistics with Means and Standard Deviations for Pupil Evaluation Inventory (PEI) Factor Scores and Scores from the Children's Social Support Scale (CHISS) as a Function of Type A and Type B Status, for the Complete Sample.

	Type A (n=85)		Type B (n=91)			
Measure	Mean	SD	Mean	SD	F	p
Pupil Evaluation Inventory						
Aggression	12.81	12.56	7.37	9.63	6.58*	.010
Withdrawal	8.05	7.96	7.55	9.53	2.98	.086
Likeability	9.92	10.02	14.66	13.35	3.98	.048
Children's Social Support Scale						
Qualitative	83.14	11.78	88.70	8.80	10.16*	.002
Quantitative	16.85	3.57	17.16	2.93	.00	.947

*p<.01 (.05/5)

Note. The values for means and standard deviations represent scores for untransformed data. Peer nomination scores are raw nomination totals for each factor across all nominations.

Table 7

ANOVA Summary Statistics with Means and Standard Deviations for Pupil Evaluation Inventory (PEI) Factor Scores and Scores from the Children's Social Support Scale (CHISS) as a Function of Sex, for the Complete Sample.

	Boys (n=79)		Girls (n=97)			
Measure	Mean	SD	Mean	SD	F	p
Pupil Evaluation Inventory						
Aggression	13.79	14.27	6.91	7.18	9.29*	.003
Withdrawal	6.72	8.98	8.62	8.58	3.84	.052
Likeability	10.05	9.86	14.26	13.35	3.31	.071
Children's Social Support Scale						
Qualitative	87.08	9.95	85.16	11.22	1.94	.165
Quantitative	16.30	3.59	17.59	2.84	7.59*	.007

*p<.01 (.05/5)

Note. The values for means and standard deviations represent scores for untransformed data. Peer nomination scores are raw nomination totals for each factor across all nominations.

Table 8

Total Frequencies, Means, Standard Deviations, and Kappa Values for the Observational Variables.

	Total Frequency	Mean	SD	Kappa
Association Variables				
Alone	842	16.84	12.47	.76
Teacher**	63	1.26	4.12	.73
Teacher + Peer**	314	6.28	11.01	.80
Peer	4776	95.52	18.57	.73
Same Sex Peer Group	3147	62.94	28.69	.91
Mixed Sex Peer Group	1389	27.78	23.11	.86
Opposite Sex Peer Group**	240	4.80	8.67	.75
Level of Involvement Variables				
Watching	1408	28.16	15.03	.73
Medium	3417	68.34	22.37	.73
Central**	300	6.00	5.77	.58

(table continues)

Table 8 (continued)

	Total Frequency	Mean	SD	Kappa
Type of Social Activity Variables				
Unoccupied + Motor	875	17.50	12.05	.67
Vocal	1174	23.48	15.17	.74
Aggression**	6	.12	.39	0.00
Rough and Tumble Play**	68	1.36	2.11	.70
Cooperation	2480	49.60	34.21	.92
Social Initiations/ Terminations Variables				
Target Initiates**	150	3.00	2.00	.57
Target Terminates**	31	.62	.99	0.00
Other Initiates**	64	1.28	1.49	.28
Other Terminates**	12	.24	.48	0.00

*Note. The Aggression Initiated, Aggression Against, and Retaliatory Aggression variables were collapsed into an overall Aggression variable due to infrequency of occurrence.

**Note. These variables were not considered in the analyses.

Table 9

Summary Statistics for Univariate Fs and Stepdown Analyses for the Observational Variables of Alone and Peer.

Independent Variable	Dependent Variable	Univariate F	df	Stepdown F	df	p
Grade	Alone	6.7009	1/42	6.7009*	1/42	.013
	Peer	3.4731	1/42	.0014	1/41	.970

Note. A significance level cannot be evaluated but would reach $p<.02$ (.05/3) in the univariate context.

*$p<.02$.

Table 10

Summary Statistics for Univariate Fs and Stepdown Analyses for the Observational Variables of Watching and Medium/Central.

Independent Variables	Dependent Variables	Univariate F	df	Stepdown F	df	p
Group by Grade	Watching	6.3184	1/42	6.3184*	1/42	.016
	Medium/ Central	2.7994	1/42	2.3105	1/41	.136
Grade	Watching	5.6561	1/42	5.6561*	1/42	.022
	Medium/ Central	9.0594	1/42	3.8108	1/41	.058

Note. A Significance level cannot be evaluated but would reach p<.025 (.05/2) in the univariate context.

* p<.025

Table 11

Summary Statistics for Univariate Fs and Stepdown Analyses for the Observational Variables of Cooperation, Vocal, and Unoccupied.

Independent Variable	Dependent Variable	Univariate F	df	Stepdown F	df	p
Grade	Cooperation	2.3415	1/42	2.3415	1/42	.133
	Vocal	1.0110	1/42	15.4443*	1/41	.000
	Unoccupied	8.9472	1/42	2.8998	1/40	.096

Note. A Significance level cannot be evaluated but would reach $p<.02$ (.05/3) in the univariate context.

*$p<.02$.

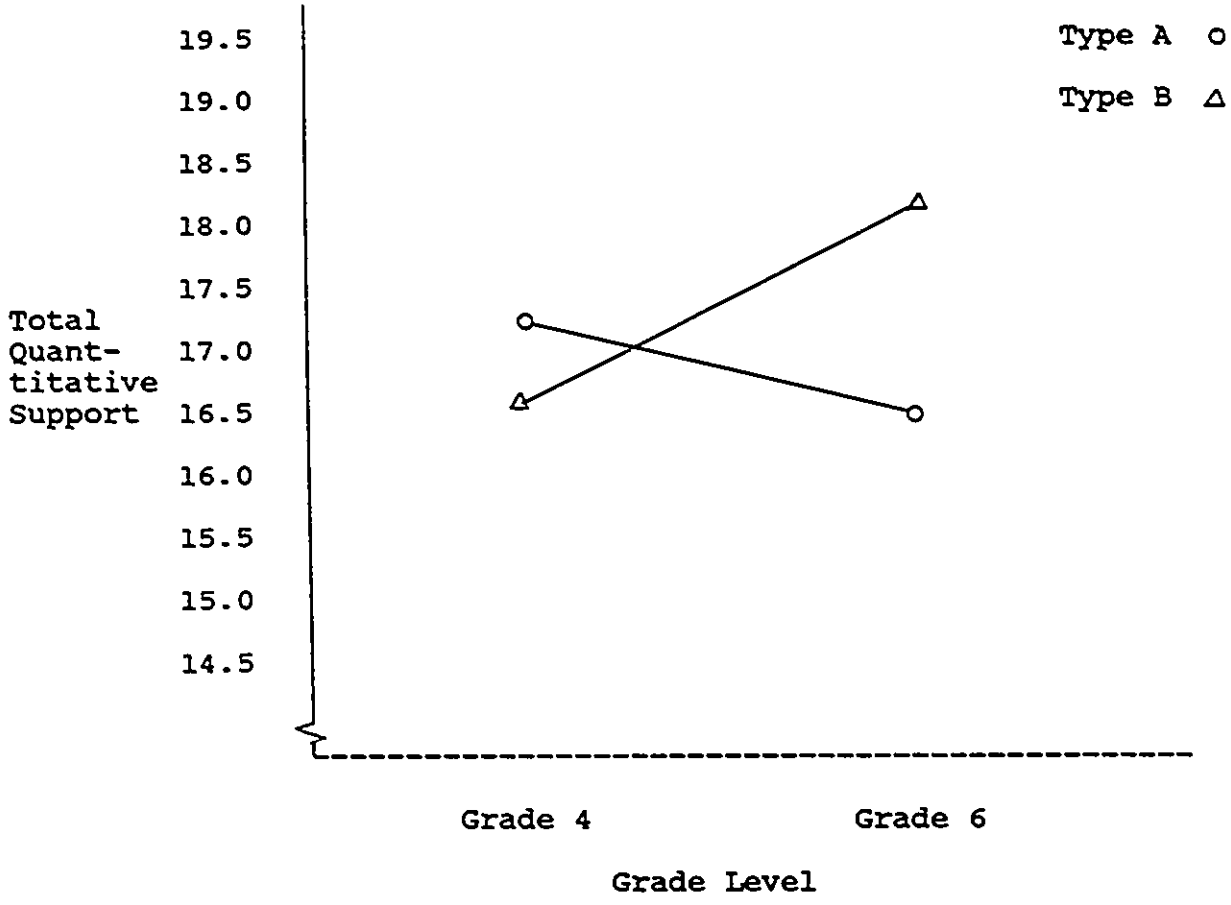

Figure 1. Means for Total Quantitative Support as a Function of Grade Level and Type A/B Status.

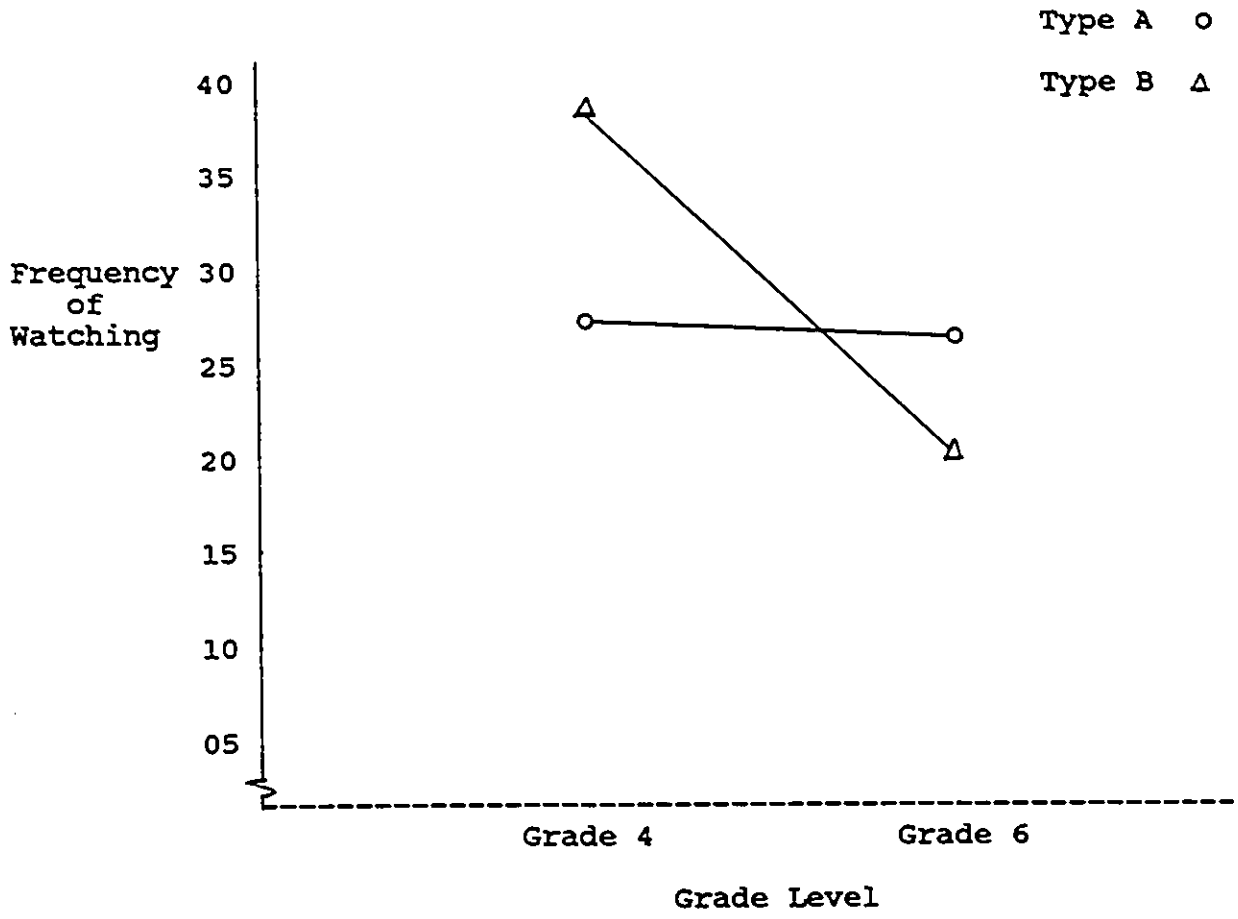

Figure 2. Means for Watching as a Function of Grade Level and Type A/B Status.

Footnotes

1. Previous research has defined Type A and Type B utilizing different methods. That is, some studies have used extreme scores to identify Type A and Type B subjects, while other studies have examined the entire distribution of scores. Hunter et al. (1982) and Wolf et al. (1982) used extreme scores to define Type A and Type B in children, selecting the top and bottom quintiles, and the upper and lower 20 subjects in each race/sex group. Weidner et al. (1988) identified Type A and Type B in a sample of fathers using the top 30% and bottom 30% of the sample. Thoresen et al. (1988) selected subjects as Type A or Type B if their scores on a composite measure of Type A were in the top or bottom 35% of the distribution. The entire distribution of scores was used by Wolf et al. (1981) and Jose and Langer (1989) to identify race, sex and age differences and sex and grade differences. Manning et al. (1987) used the entire distribution of Type A scores to investigate the prevalence of Type A traits in children from differing socio-economic status backgrounds.

Given that the focus of this study was to examine Type A and Type B group differences on a number of social competence measures, the alternative for

defining groups involved the use of extreme scores or a median split procedure. The rationale behind using extreme scores is to increase the likelihood of finding a significant difference between groups and to decrease the heterogeneity of the sample (Thoresen et al. 1988). The problems associated with this method are that the sample size is greatly reduced, which in turn decreases the power of the statistical analyses (Stevens 1986, pg. 138), and that generalizability of the findings to the whole population may be compromised since only extreme scores are included in the analyses. For these reasons, a median split was chosen to define Type A and Type B status.

2. MANOVA is generally thought to be robust to violations of underlying assumptions. However, this does not hold when cell sizes are small and have unequal ns (Kirk, 1982). Table 1 presents the number of subjects per cell. Factorial MANOVAs with unequal sample sizes have been found to produce unstable solutions (Milligan, Wong & Thompson, 1987). Cell sizes can be equalized by random deletion of cases. However, given that equalization of cell sizes in this case would necessitate the loss of a substantial amount of data, it was decided that no data would be deleted.

Results pertaining to the observational sample should thus be interpreted cautiously and may best serve as a means of generating hypotheses to guide future research.

Appendix A

research for action

File no: 422

Dear Parent:

The Advisory Research Committee of the Ottawa Board of Education has approved a research project to be conducted by researchers from the University of Ottawa. The purpose of the study is to learn more about the Type A behaviour pattern in elementary school aged children. As you may know, this pattern of behaviour is associated with heart disease in adults. We anticipate that this study will help us appreciate the relationship between Type A behaviour and children's social functioning.

Participation by your child in this research will require two class periods during which he/she will be asked to complete paper and pencil questionnaires; questions concerning peer relationships, social support, and Type A behaviour. In addition, unobtrusive observations of free play during recess periods will be carried out. You should be assured of confidentiality of materials.

Please find attached a consent form which requires your signature if you agree to allow your child to participate. If you have further questions regarding this study please feel free to contact the researchers, Francine Chappus and Dr. Jane Ledingham at the Child Study Centre, University of Ottawa, (564-2463) or Jackie Unitt or myself at the Research Centre (563-2408).

Sincerely,

MP/mce

Michael Parkin, Ph.D.,
DIRECTOR OF RESEARCH

Enc.

research centre / centre de recherches
The Ottawa Board of Education / Le Conseil scolaire d'Ottawa
Location: 662 Lyon St. S., K1S 3Z2. tel. 563-2408 Mailing address: 330 Gilmour St., K2P 0P9

Appendix B

CONSENT FORM

I hereby give consent for the participation of my child

_____
(Please print child's name)

or

I hereby do not give consent for the participation of my child

_____
(Please print child's name)

in a research project conducted by the University of Ottawa in conjunction with our school board. I understand that:

1. The purpose of this study is to investigate the relationship between Type A behaviour in children and social functioning.

2. Type A behaviour data will be derived from a questionnaire. Also, social functioning will be measured through two additional questionnaires as well as unobtusive observations of my child's free play during recess.

3. Participation will involve approximately one 1 hour session and one ½ hour session in which my child will complete questionnaires measuring peer relationships, perceived social support, and Type A behaviour.

4. This information will be used only for research and maintained in strictest confidence.

5. Individual results will not be released without my written consent.

6. I may withdraw my child at any time.

Signed:_____ Date:_____
(Parent's signature)

I hereby give my consent to participate. _____
(Child's signature)

Thank you for your assistance and cooperation.

Please have your son/daughter return this form within a week to his/her teacher.

Appendix C

Hunter-Wolf A/B Rating Scale

Name: _____
Age: _____
Sex: _____
Grade: _____

Below are a number of statements and each are followed by numbers 1 to 7. You are to circle a number for each of the statements that best show how well the statements fit you.

For example:

I like to play outside. I like to play in the house.

1 2 3 4 5 6 7

1 means that "I like to play outside" fits you perfectly.

7 means that "I like to play in the house" fits you perfectly.

If you sometimes like to play in the house but most of the time like to play outside you would circle number 2.

---

1) I am easy going. I am hard driving.

1 2 3 4 5 6 7

2) I feel time passes quickly. I feel time passes slowly.

1 2 3 4 5 6 7

3) I walk fast. I walk slowly.

1 2 3 4 5 6 7

4) I take it easy and put little effort into the things I do. — I go all out and put a lot of effort into the things I do.

1 2 3 4 5 6 7

5) It does matter if I'm late. — It doesn't matter if I am late.

1 2 3 4 5 6 7

6) I always want to win at everything. — I don't care if I win at anything.

1 2 3 4 5 6 7

7) I often break in or finish when someone else is talking. — I always sit and listen when someone else is talking.

1 2 3 4 5 6 7

8) I have no interests. — I have many interests.

1 2 3 4 5 6 7

9) I want to do better in school. — I am satisfied with how well I am doing in school.

1 2 3 4 5 6 7

10) I find it difficult to wait. — I find it easy to wait.

1 2 3 4 5 6 7

11) I talk slowly. — I talk fast.

1 2 3 4 5 6 7

12) I talk loud. I talk softly.

1 2 3 4 5 6 7

13) I always feel rushed. I never feel rushed.

1 2 3 4 5 6 7

14) I eat slowly. I eat fast.

1 2 3 4 5 6 7

15) I think about many things at the same time. I think about one thing at a time.

1 2 3 4 5 6 7

16) I like to argue. I don't like to argue.

1 2 3 4 5 6 7

17) I often get into fights. I never get into fights.

1 2 3 4 5 6 7

18) I like to tell others what to do. I don't like to tell others what to do.

1 2 3 4 5 6 7

19) It takes alot to get me angry. It takes very little to get me angry.

1 2 3 4 5 6 7

20) I am always a leader in activities. I am never a leader in in activities.

1 2 3 4 5 6 7

21) My friends always pick me to be leader when we play games.	1	2	3	4	5	6	7	My friends never pick me to be leader when we play games.
22) I drink fast.	1	2	3	4	5	6	7	I drink slowly.
23) I have many hobbies.	1	2	3	4	5	6	7	I have few hobbies.
24) I lose my temper easily.	1	2	3	4	5	6	7	I do not lose my temper easily.

Appendix D

Items for the Pupil Evaluation Inventory

1. Who is taller than most?

2. Who helps others?

3. Who can't sit still?

4. Who tries to get other people into trouble?

5. Who is too shy to make friends easily?

6. Whose feelings are too easily hurt?

7. Who acts stuck-up and thinks they are better than everybody else?

8. Who plays the clown and gets others to laugh?

9. Who starts a fight over nothing?

10. Who never seems to be having a good time?

11. Who is upset when called on to answer questions in class?

12. Who tells other children what to do?

13. Who is usually chosen last to join in group activities?

14. Who is liked by everybody?

15. Who always messes around and gets into trouble?

16. Who makes fun of other people?

17. Who has very few friends?

18. Who does strange things?

19. Who is your best friend?

20. Who bothers people when they are trying to work?

21. Who gets mad when they don't get their way?

22. Who gives dirty looks?

23. Who wants to show off in front of the class?

24. Who says they can beat everybody up?

25. Who isn't noticed much?

26. Who exaggerates and makes up stories?

27. Who complains, nothing makes them happy?

28. Who always seems to understand things?

29. Who doesn't pay attention to the teacher?

30. Who is rude to the teacher?

31. Who is unhappy or sad?

32. Who is especially nice?

33. Who acts like a baby?

34. Who is mean and cruel to other children?

35. Who often doesn't want to play?

Appendix E

Children's Social Support Scale

Name:_____

Age:_____

Grade:_____

Sex:_____

These questions have been put together to help us learn about what people are important to you. These people can include your family, friends (at school and in your neighborhood), teachers, and others. These people may be important to you for many reasons. Some of these reasons could be that you like to spend time with them, they help you with your homework, let you know that what you have to say is important, and give you good suggestions on how to solve problems.

Instructions for Chart Below:

1. Give the first name of the people who are important to you.
2. Circle the word that best shows who this person is.
3. Give the age of each person. If you are unsure of the exact age then you can write whether the person is a baby, close to your age, a teenager, or an adult.
4. Circle either M for male or F for female.
5. Write how often you see each person.
6. Write how long you have known each person.

Name	He/She is my	Age	Sex	I see him/her	I have known him/her
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		
	Family/Friend Teacher/Other		M F		

Please read each sentence carefully and circle the answer that best fits your situation.

1. My family shows interest in what I have to say.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

2. When I am troubled by something there is someone in my family who suggests an activity that we can do together to get my mind off of things.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

3. My friends let me know that I am ok just the way I am.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

4. I never do anything alone.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

5. I wish my friends were different than they are.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

6. When I have problems I know that I can count on someone in my family to give me good ideas or say things that help me to understand my problems and work them out.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

7. I wish I were better understood by my family.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

8. I have a family member who helps me with my homework when I need it.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

9. When I do a good job on something no one lets me know it.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

10. My friends and I share secrets.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

11. I am always nice to others.

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

12. There is always someone whom I can call on when I feel like doing something (playing a game, going for a walk...).

   1) Always True
   2) Almost Always True
   3) Not Very Often True
   4) Never True

13. I think that I get more from my friends than they get from me.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

14. It seems like the people whom I am close to are always leaving.

    1) Always True.
    2) Almost Always True
    3) Not Very Often True
    4) Never True

15. My teacher helps me to understand why I did not do something well.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

16. I feel alone even among friends.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

17. I do not feel as close to my family as other people seem to be to theirs.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

18. The people in may family like each other and like to spend time together.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

19. I have never met anyone who did not like me.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

20. My family knows and likes my friends.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

21. I do not like it when other people offer me ideas on how to work out a problem.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

22. I would rather be alone than spend time with some member(s) of my family.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

23. Often two people close to me are fighting and this makes me feel like I have to pick sides.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

24. I have friend(s) who will keep the things that we talk about private - just between the two of us.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

25. Even when I have work to do that I know is hard for me I still would rather do it without help from anyone.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

26. I think that my friends get more out of our friendship than I do.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

27. I can count on my teacher to explain things when I do not understand the lesson.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

28. My friends can count on me to cheer them up when they are down.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

29. There are some days when I wonder if my friends still want to hang around with me.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

30. I choose who my friends will be.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

31. I know that my friends will stand by me or stick up for me when someone else is giving me a hard time.

    1) Always True
    2) Almost Always True
    3) Not Very Often True
    4) Never True

Note: Items 1, 2, 3, 6, 8, 10, 12, 15, 18, 20, 24, 27, 28, 30, and 31 were reversed scored.

Appendix F

Behavioral Observation Categories

Association Categories

1. Alone
   All parts of the target child are at least three feet from the nearest person and there is no activity connecting the two (playing ball, chasing one another, etc.). Code alone if the person is within three feet at the coding signal but continues on and does not stop.

2. Peer
   Any part of the target child is within three feet of another peer(s), or there is an activity connecting them. In addition, this includes a count of the number of peers with whom the target child is involved as well as an indication of the number of same and opposite sex peers. Do not score if the target child is just walking by a peer(s) and does not stop. If the target child is within three feet of a peer(s) who in turn is less than 3 feet from another peer(s) include all of these children in the peer category.

3. Teacher
   Score when the target child is within three feet of a teacher and/or there is an activity connecting them. Do not score if the child is just walking by the teacher.

4. Teacher/Peer
   Score when the target child is within three feet of a teacher and a peer and/or there is an activity connecting them. Do not score if the child is just walking by a teacher and peer.

Composition of Peer Group

1. Same Sex Group
   If the target child is within three feet of a same sex peer(s) and/or there is an activity connecting them, code the sex of the peer. Do not code if the child is just walking by a samesex peer(s).

2. Mixed Sex Group
   If the target child is within three feet of a same sex peer(s) and an opposite sex peer(s) and/or there is an activity connecting them, code both male and female. Do not code if the child is just walking by a peer(s).

3. Opposite Sex Group
   If the target child is within three feet of an opposite sex peer(s) and/or there is an activity connecting them, code the sex of the peer. Do not code if the child is just walking by an opposite sex peer(s).

Level of Involvement

1. Watching
   The target child watches another peer(s) and/or a teacher from a distance of more than 3 feet. There is no activity connecting the target child with another person(s). The target child shows a definite orientation toward another person(s) so that the other person is in his/her line of vision. Or, the target child is within three feet or more of another peer(s) or teacher and is watching and/or occasionally participating. Note - if the target child is involved in an ongoing activity, disregard distance. If the target child is playing in a game or involved in an activity that entails following the play and the child prefers to wait until the ball or center of play comes to him/her then code Watching (eg. basketball, or soccer). However, if the target child's position requires him/her to stay in a certain physical space relative to the whole playing field, and the child does this, then code medium (eg. outfielder in baseball).

2. Medium
   The target child is within three feet of another peer(s) and/or a teacher and is actively following and participating in the ongoing activity or interaction. If the target child is playing a position in a game like soccer (goalie) or baseball that requires that the child cannot always be where the ball is in play then code medium if he/she continues to play his/her position. If the target child is engaged in an ongoing activity and this requires that the distance between players increases beyond 3 feet disregard distance.

3. Central
   The target child is within 3 feet or more of another peer(s) and/or teacher and is the focus of that other peer(s) and/or teacher's attention. In instances of conversation between two persons, be sure that the target child is receiving more attention than the other individual(s) involved. If in instances involving two or more individuals other than the target child, the target child is the focus of another's attention at the time of the code signal then code central (even if this involves the target child having the ball, in a game, and the other individuals involved are focused on him/her for that reason).

Type of Social Activity

1. Unoccupied/Motor
   The target child is engaged in no activity. He/she is not watching another child or teacher. If he is watching another person(s) and doing nothing else, code Watching. If the target child is within 3 feet of another child(ren) and/or a teacher and does not appear to be interacting with the other individuals present or watching them, then code Unoccupied. The child does not have to be alone to code this category.
   Alternatively, if the target child does not appear to be interacting with, or watching another individual and is making movements greater than one foot with his arms or legs then code Unoccupied. The category also includes small motor movements such as manipulating an object, picking flowers,

and stereotyped activity (small repetitive movements - patting sand). This category can also be scored if the child is walking fast or running.

2. Vocal
   The target child is engaged in active talking and/or listening with another peer(s) and/or teacher. To code this variable, it is essential that movement of the mouths of the individual's involved be observed.

3. Aggression Initiated
   This includes aggression initiated by the target child not preceeded by aggression by another. This includes intentional pushing, kicking, biting, choking, poking, pinching, pulling forcefully, intentional colliding, hiting with an object, wrestling (other than rough and tumble play), tripping, hanging on or jumping on, grabbing at clothes, and projecting an object towards another person. This also involves interfering with the activity of another person(s) (eg. stealing a ball when someone is playing).

4. Aggression Against
   The target child can be the recipient of another child's aggressive behavior (see above for examples). This behavior is not preceeded by an act of aggression by the target child.

5. Retaliatory Aggression
   This occurs in response to an aggressive act. For a response to be coded as retaliation the target child can be engaged in no other activity from the time he/she is aggressed against to the time of his/her response.

6. Rough and Tumble Play
   The target child is engaged in mock aggressive behavior with another peer(s). To determine if the behavior is aggressive or not attend to the facial expression on the individuals involved for intention and perceived threat. That is, if the participants are laughing and appear to be enjoying themselves, then code Rough and Tumble Play.

7. Cooperation
   The target child is engaged in maintaining an ongoing activity with another peer(s) and/or teacher. This includes structured activities such as games and involves sharing a common play experience (either cooperative or competitive). Also, the target child can be helping a child who is hurt or waiting to take a turn in a game. This can also include chasing behavior when those involved show facial expressions of enjoyment.

Social Initiations/Terminations

1. Initiation - Target
   The target initiates an interaction with a peer(s) and/or teacher which may include the following ways: reaches out to touch another individual, initiates conversation, joins in an ongoing activity, walks up to another individual and remains proximal to him/her, initiates eye contact with another child and elicits another child's attention.

2. Initiation - Other
   A peer or teacher initiates an interaction with a target. This may include the following ways: reaches out to touch the target, initiates conversation with the target, walks up to the target and remains proximal to him/her, and initiates eye contact with the target.

3. Termination - Target
   The target child terminates an interaction with a peer(s) and/or teacher which may include the following ways: a refocusing or reorienting away from another individual; the target child turns his/her back on another individual but remains in the same physical proximity, or walks away.

4. Termination - Other
   A peer or teacher terminates an interaction with a target child. This may include the following ways: refocusing or reorienting away from the target; the peer or teacher turns his/her back on the target child but remains in the same physical proximity, or walks away.

Appendix G

Behavioral Coding Sheet for Observational Variables

Name:_____
School:_____
Date:_____
Observer:_____
Recess: M L A
Reliability Partner:_____

1.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
2.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
3.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
4.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
5.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
6.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
7.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
8.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
9.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
10.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
11.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
12.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
13.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
14.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
15.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
16.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT

continued....

17.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
18.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
19.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
20.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
21.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
22.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
23.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT
24.	A	T	M	F	W	M	CE	U	V	AI	OA	AR	RT	C	TI	TT	OI	OT

Appendix H

Data Screening and Evaluation of Assumptions for Statistical Analyses

The following section considers issues concerning missing data, and assumptions of normality, homogeneity of variance-covariance, linearity, multicollinearity, and multivariate outliers.

Missing Data. Five subjects had missing data on one item of the qualitative section of the Children's Social Social Support, while two additional subjects had missing data on one item of the Hunter-Wolf A/B Rating Scale. In determining the mode of treatment of missing data, Keppel (1982, pg. 419) points out the importance of considering whether loss of data is related to the conditions of the study, or is best attributed to chance factors alone. Given that the amount of missing data was small and that there was no reason to believe that the loss was systematically related to the conditions of the research, it was decided that the missing data would be estimated and the estimates subsequently used during data analysis.

Tabachnick and Fidell (1989) provide several

alternatives for estimating missing data. The first is referred to as 'Prior Knowledge' and involves replacing a missing value with a value based on a "well educated guess": researchers who have worked in a particular area of study for a reasonable amount of time may feel confident in using this procedure (Tabachnick & Fidell 1989, pg. 63). One alternative to this procedure involves replacing the missing value(s) with the mean score from the complete sample of subjects. Another alternative involves using the group mean for a missing value. The use of the mean for the entire sample was chosen for the following reasons. First, given that the Children's Social Support Scale was developed for the present research study, and that the Hunter-Wolf A/B Scale was used for the first time by this researcher, no prior knowledge was available on which to make a "well-educated guess". Second, Tabachnick and Fidell (1989, pg. 64) recommend the use of the sample mean because of its conservative nature. With this procedure, the mean of the distribution as a whole does not change and the researcher does not have to estimate values. However, the disadvantages are that the "variance of the variable is reduced because the mean is closer to itself than to the missing value it replaces, and the correlations the variable has with

other variables is reduced because of the reduction in variance" (Tabachnick & Fidell, pg. 64). These authors point out that the loss in variance depends on the amount of missing data. Given that the amount of missing data in the present sample was very small, it is unlikely that the variance was affected in a way that would influence the statistical findings appreciably.

Evaluation of Assumptions for the Complete Sample. Given that the distributions for all dependent measures were found to be significantly skewed, data transformations (Tabachnick & Fidell 1989, pg. 84) were performed. Log transformations were performed on both peer-rated aggression and withdrawal scores since these distributions showed a small, yet significant, amount of positive skewness. A square root transformation was applied to peer-rated likeability scores because the distribution was positively skewed to a moderate degree. The distributions for Total Qualitative Support and Total Quantitative Support were first reflected because of negative skewness and then a square root transformation was applied to correct for moderate skewness.

The Box's M Test was used to assess homogeneity of

variance-covariance. Tabachnick and Fidell (1989, pg. 379) recommend an alpha level of $p=.001$ to be used as the criterion for significance for this test because of its sensitivity. The Box's M Test yielded a value of $F(105, 26377)=1.2467$, $p<.05$.

Linearity was assessed by examining the scatterplots of all pairs of dependent variables. No gross deviations from linearity were found.

Inspection of the Pearson correlation matrix for dependent variables indicated that multicollinearity was not a problem. Values in excess of .90 are thought to be indicative of redundant variables and therefore of multicollinearity (Tabachnick & Fidell 1989, pg. 87). In the present study, correlations ranged from $r=.02$ to $r=.26$ (see Table 3).

Three univariate outliers were found, 2 for Total Qualitative Support and 1 for Total Quantative Support. Because the number of outliers was small, the decision was made to include the data of these three subjects in the analyses. However, in fact analyses run with the univariate outliers deleted yielded the same findings as with the outliers included.

According to Tabachnick and Fidell (1989, pg. 69) the criterion for multivariate outliers is Mahalanobis distance at $p<.001$, where distance scores are compared

to a critical $\underline{X}^2$ value with degrees of freedom equal to the number of dependent variables. No multivariate outliers were found.

Evaluation of Assumptions for the Observational Sample. In checking the assumption of normality for the Association variables, the distribution for the Peer variable was found to be significantly negatively skewed. The decision was made not to transform the data because the small n precluded the variable from being normally distributed even when transformations were applied.

The Box M multivariate test was used to assess homogeneity of variance-covariance for the Association categories. This test yielded a value of $\underline{F}(21,1411)=2.6912$, $\underline{p}<.001$, which indicated that the assumption of homogeneity of variance was violated. The univariate Bartlett-Box F homogeneity of variance test for the Peer variable was significant, $\underline{F}(7,1152)=2.5211$, $\underline{p}=.05$. Heterogeneity of variance of this variable therefore accounted for the significance achieved at the multivariate level on the test of homogeneity of variance-covariance.

Linearity was assessed by examining the scatterplots of the pairs of dependent variables. It

was found that Alone was not linearly related to the Peer variable in either the Type A or the Type B group.

Inspection of the Pearson correlation coefficients for the dependent variables indicated that multicollinearity was not violated. The correlations ranged from r=.01 to r=.71. The table below presents the intercorrelations between the observational variables, for the observational sample. Values in excess of .90 are thought to be indicative of multicollinearity (Tabachnick & Fidell, 1989, pg. 87).

One univariate outlier was found for the Peer variable. No multivariate outliers were found. It was decided to include this univariate outlier.

Intercorrelations between Observational Variables for the Observational Sample.

Variables	Alone	Peer	SSex	MSex	Watch	Medcen	Unocc	Vocal	Coop
Alone	1.00	-.71	-.28*	-.26*	.62***	-.70***	.65***	.18	-.57***
Peer		1.00	.53***	.19	-.57***	.58***	-.48***	-.13	.45***
Same Sex			1.00	-.68***	-.22	.15	-.01	.13	.05
Mixed Sex				1.00	-.25*	.32**	-.36**	-.27*	.33**
Watching					1.00	-.93***	.63***	.35**	-.80***
Medium Central						1.00	-.87***	-.48***	.91***
Unoccupied							1.00	.54***	-.85***
Vocal								1.00	-.79***
Cooperation									1.00

p<.05*
p<.01**
p<.001***