PATTERNS OF IMAGERY IN VARIOUS EMOTIONS EXPERIENCED BY ABLE-BODIED AND SPINAL CORD INJURED INDIVIDUALS

by

DAVID K. METCALF

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Name:

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Examining Committee:

Chair: Dr. William Krane

Dr. James E. Marcia
Senior Supervisor

Dr. Vito Modigliani

Dr. Adam Horvath
External Examiner
Faculty of Education
Simon Fraser University

Date Approved: Sept. 14/89

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David Kelly Metcalf

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ABSTRACT

This study was undertaken to see what changes may occur in the imagery arising from mentally experienced emotions for male subjects who have received a major and permanent spinal cord injury. The experimental group was 20 permanently disabled young adult males receiving rehabilitation after having become disabled within the previous six months. The control group was 20 able-bodied male students of the same ages, attending university. Both samples completed questionnaires on the imagery arising from 24 mentally experienced emotions using the phenomenological introspection method.

The general research hypothesis was that there would be significant differences in the levels of imagery arising from 24 emotions when comparing the experimental group to the control group. Depending upon the pattern of differences, conformation of this hypothesis might support the stage theory of adjustment to a permanent spinal cord injury; the theory that there is a pattern of depression after a permanent spinal cord injury and if not, this implies the denial of disability; and the theory that disruption in the autonomic nervous system and its afferent return would cause notable changes in experienced emotional feelings. The two groups differed in only one imagery category, inner focus of attention. However, when the level of significance was relaxed the two groups also differed in the imagery categories Number of Thoughts & Images; Places - Manmade & Nature; Time - Past, Present & Future; Consequences Implied; Situation Initiated by Self; Situation Initiated by Others; and Inner Focus of Attention.

Within the imagery category Inner Focus of Attention, there were significant differences between the disabled and able-bodied groups for the emotions anxiety, worry; boredom; friendliness, outgoing; sadness; and shame, ashamed.

Even when taking these differences into account, this study still indicates that individuals do not necessarily proceed through a uniform, sequential series of stages to adjust to a permanent spinal cord injury, nor does a pattern of depression or denial always accompany a permanent spinal cord injury, nor does a permanent spinal cord injury which leads to disruption in the autonomic nervous system and its afferent return necessarily affect an individual's ability to experience emotions.

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This Master's thesis is dedicated to the memory of Dr. Bernard Lyman (1923-1988). Without his initial ideas, guidance and encouragement this research would not have been undertaken.

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A. INTRODUCTION

The medical profession has published extensive research about the physiological and physical aspects of spinal cord damage and the effects it will have on subsequent rehabilitation. However, to this date the medical community offers little hope in providing an answer for curing a spinal cord injury in any satisfactory manner. Within this context, Roberts (1972) wrote:

> It is paradoxical that while the bulk of the literature published on spinal cord injury emphasizes the medical issues, some of the major problems are psychological and social. The psychological aspects of the spinal cord injured patient have not been adequately studied or evaluated
>
> (p.1115)

Hallin (1968) came to the conclusion after doing a followup study of people who had been discharged after receiving rehabilitation for a spinal cord injury that "psychological adjustment, rather than intellectual capacity or the level or completeness of injury, is the critical factor in determining rehabilitation success" (p.128).

Berk and Feibel (1978) did a followup study of 85 disabled persons who had been discharged from a rehabilitation centre six months previously. They found that 50 percent reported that they had received little or no help in working out their social, financial or emotional problems, whereas only 13 percent were dissatisfied with the amount of help they had with activities of daily living (e.g. daily grooming).

In a similar fashion, Udin and Keith (1978) also studied a group of 60 disabled persons who were recently discharged from a rehabilitation centre. They came to the conclusion that:

> if the ... objective of rehabilitation is to encourage as normal a lifestyle as possible, more emphasis must be put on skills in the constructive use of leisure time and social interaction. These skills are predominantly developed in recreation, psychological, and social service therapies, not in the functionally oriented physical and occupational therapies which are given the greatest priority during an inpatient program
>
> (p.19)

Finally, as stated by Trieschmann (1980), who is one of the foremost authorities on the psychological aspects of a permanent disability, for the recently injured spinal cord person to function successfully in society requires more than just using the newly learned techniques of mobility and activities of daily living; it also requires the

> ... ability to interact socially in quite sophisticated ways, compete successfully with one's peers in social, recreational, educational, vocational and economic spheres. Thus it would appear that the content of the traditional rehabilitation program has been inadequate to meet the needs of the disabled persons
>
> (p.23)

One of the reasons for the lack of research on the psychological aspects, especially the emotional reactions, to a permanent spinal cord injury is the bias towards the physiological aspects of the injury in a rehabilitation centre since the primary caretakers are from the medical profession. This necessarily leads towards the physiological aspects of emotions which has a long history of controversy. A few researchers such as Dunbar (1946), Ars (1953), and Eckman, Levenson and Triesen (1983), have shown different physiological changes characteristic of a few emotions. However, others, such as Candland (1977) and Mandler

(1984), after reviewing the literature, assert the absence of characteristic visceral responses for different emotions.

The identification of discrete emotions through behavioural methods has also had its difficulties. Though researchers such as Eckman and Friesen (1975) and Izard (1977) have produced studies that show emotion identification by facial expressions, the number of emotions for which specific motor correlates have been clearly identified is very small.

Failure to find autonomic differentiations has been attributed to the difficulties of evoking a variety of true emotions under controlled laboratory conditions (Sternbach, 1962) or to the lack of precision and sensitivity in existing measuring instruments (Ax, 1963). Another possibility is that the physiological and behavioural changes occur as complex patterns, as Frois-Wittman (1930) suggested many years ago, of several changes, each of which cannot be detected independently and the patterns of which elude objective measuring devices.

Since individuals (Lyman, 1986) are able to distinguish experientially many more emotions than can be demonstrated by physiological and behavioural measures, it may also be that their "sensory correlates show themselves in consciousness with sufficient clarity to make differentiation of a variety of experienced emotions possible" (p.26).

The renewed acceptance (Lyman, 1986) of phenomenological and introspective reports suggests that an alternative to direct or external measurement of emotions is to ask respondents to report the images that occur when different emotions are experienced.

Few theories examine the relationship between emotion and imagery. The psychological theories that do look at the imagery arising from emotional experience are the Gestalt theories. The specific Gestalt theory of emotion, the Experiential theory (Lyman 1982), is

particularly relevant in that imagery plays a very prominent role in explaining how individuals experience emotion.

The complaint that evoking emotions in an artificial setting such as in an experimental situation can be alleviated by findings from imagery and behaviour therapy research which show that imagining or reliving emotions produces physiological changes in the emotions studied similar to those occurring in actual emotion-evoking situations (Barber and Hahn, 1964; Craig, 1968; Bauer and Craighead, 1979; Lang, 1979). Imagining an emotion experience can also produce characteristic patterns of thought (Izard, 1972, 1977) and characteristic behavioural responses (Schwartz, Fair, Greenberg, Freedman & Klerman, 1974).

It is hoped that by having subjects experience emotions through the phenomenological introspection method and by focusing on the arising imagery the results of this research will be more informative and conclusive than previous research. As well, by taking a very extensive view of the emotional reactions rising from a permanently damaging spinal cord injury, by testing for 24 emotions, we may be provided with some new insights into the psychological aspects of this disability.

B. HISTORICAL BACKGROUND

I. Group that Receives a Spinal Cord Injury

Trieschmann (1980) notes that a spinal cord injury is what is known in the medical community as a low incidence but high cost disability that requires tremendous changes in a person's lifestyle. Based on the data collected from 1973 through 1977 in the United States, some information about a large sample of spinal injured population is becoming available (National Spinal Cord Injury Model Systems Conference, 1978).

Approximately 62 percent of the spinal injuries occur to persons aged 15 through 29. Thus, the spinal cord injured group is predominantly a young one. 48 percent of those reaching the regional spinal injury centres have paraplegia and 52 percent have quadriplegia.

Table 1 lists the causes of injury for those who sustain paraplegia and quadriplegia. Vehicular accidents are the most frequent cause of spinal injury. The statistics show that the incidence of quadriplegia as the result of a sports injury is over ten times greater than paraplegia.

Young (1977) has indicated that 82 percent of spinal injuries occur to males and 18 percent occur to females. Table 2 shows that, for both sexes, vehicular accidents are the primary cause of spinal injury, although more females than males obtain their injury in this manner. Further analysis reveals that 57 percent of the victims possess high school education or more and that the majority were working (58 percent) or were full-time students (24 percent) at the time of their injury.

Among given communities, there are likely to be differences in etiology of injury. In British Columbia, although motor vehicle accidents, as in the United States, are the major cause of spinal cord injuries as can be seen in Table 3, there is also a relatively high number

caused by falls due to the province's major industry, logging, especially for males. When comparing the tables from the United States to British Columbia, one immediately notices the high percentage of spinal injuries caused by penetrating wounds (i.e. the vast majority of these caused by gunshot wounds). Spinal injuries from gunshot wounds rarely occur in Canada, but cause 11.6% of the total spinal cord injuries in the United States. The most probable explanation is related to the differences in handgun legislation.

Table 4 reveals that between April of 1988 and March of 1989 there were 118 permanent male spinal cord injuries in British Columbia. Of these, 67 were between the ages of 17 to 35 which were considered for this study. Again, motor vehicle accidents are the major cause of permanent spinal cord injury, although sports and falls also play a prominent role.

In conclusion, the statistics clarify that the spinal cord injured population are "predominantly male, quite young and active, with a history of productive educational and vocational endeavours. As a group they tend to be fairly well educated by the time they receive their spinal injuries" (Zejdlik, 1983, p.10).

With advances in medical technology, this group may achieve a life expectancy that is not too different from that of the able bodied person.

II. Sudden and Permanent Disability

A spinal cord injury is defined as a lesion of the cord that, if complete, will cause permanent motor paralysis below the level of the lesion with corresponding loss of sensation.

Quadriplegia refers to paralysis of the lower and upper portions of the body including partial or complete involvement of the arms and hands. Quadriplegia occurs with injury to the cervical spinal segments (Figure 1).

Paraplegia refers to paralysis of the lower portion of the body, which includes the legs and may include the trunk. Paraplegia occurs with injury to the thoracic spinal segments or below (Figure 1).

The National Spinal Cord Injury Foundation (1981) emphasizes:

> The catastrophic nature of the spinal cord injury is much more complex than loss of feeling and inability to move. Individuals who experience damage to their spinal cords also contend with impairment of bladder, bowel, and sexual function. Added to this are the psychological effects of adjustment that must be made to social, economic, and emotional ramifications of a spinal cord injury (p.26).

The onset of a permanently disabling spinal cord injury creates tremendous social implications for the disabled person. "He perceives himself as different, and this is repeatedly confirmed by others' reaction to him" (Safilias-Rothschild, 1970, p.10). Because of this he needs to learn a variety of new social skills in order to fight this altered view plus the rejection he will experience from others. The concept of the self undergoes a change, as one learns that people respond differently now that one is disabled. Goffmen (1963) believes that "the self-concept changes because upon becoming disabled a person perceives himself with the

same degree of negativism as he has viewed others with disabilities or stigmas prior to the injury" (p.133).

According to the World Book Dictionary (1967), the term "adjustment" under the category psychology involves two stages: "the process by which a person adapts himself to the natural or social conditions around him; the condition or relationship thus obtained."

A spinal cord injury involves not just the obvious physical impairments, but tremendous psychosocial changes that will affect how a person perceives himself. This necessarily leads the recently disabled person to attempt the adjustment to the requirements demanded of him. However, as stated by Trieschmann (1980) adjustment involves a whole series of acts, therefore it is more appropriate to discuss the process of adjustment to a spinal cord injury. The onset of a "spinal injury will place a person in disharmony with many aspects of his or her world, and, therefore, the process of adjustment may be long and complicated, difficult and multifaceted."

After numerous studies into the question as to whether there are definitive personality characteristics associated with a spinal cord injury, researchers agree that there is no specific personality related to this disability (Wright 1960; Siller 1969; Shantz 1971; Cook 1976).

Kunce and Worley (1966) studied two groups of spinal cord injured patients using the Strong Vocational Interest Blank (SVIB). The first group was made up of subjects who were active agents in their accidents; the second group was made up of subjects who were passive agents in their accidents. Those who were active agents in their accidents had higher ratings on "the aviator key of the SVIB, which is often interpreted as revealing tendencies toward adventurousness, boldness and assertiveness" (p.105). Of course, once it is known that 82 percent of spinal injuries occur in males who are in their teenage or young adult years, these results can also be interpreted as an influence of sex and age variables. Bourestom and

Howard (1965) and Taylor (1967) found that the average Minnesota Multiphasic Personality Inventory (MMPI) profiles of individuals that have suffered a spinal cord injury "revealed only mild depression with only slight elevations on scales related to impulsivity and energy level. Taylor described the average MMPI profile of his group as similar to that of male university students" (Trieschmann, 1980, p.74).

Manson (1950) administered the California Test of Mental Maturity, Advanced '47 S-Form; the Otis Quick-Scoring Mental Ability Test, Gamma Form Am; and the Wechsler-Bellevue Scale Form I. He found that a "group of 102 males with paraplegia obtained a mean I.Q. in the average range and concluded that the onset of spinal injury did not lead to mental deterioration due to the injuries" (p.193).

Vash (1975) feels that the preoccupation with finding pre-existing personality disorders takes away from the much more important psychological problem the spinal injured person is facing in terms of dealing with an altered social world. Vash put it succinctly when she stated that "rehabilitation staff use psychological tests to categorize disabled people rather than to devote the time to listening to them and helping them to resolve the reality problems they face" (p.153).

Wilcox and Stauffer (1972) came to the conclusion, after completing a followup study of 423 spinal injured subjects, that

> persons with traumatically induced spinal cord injury comprise a heterogeneous population when they arrive for treatment: age, sex, cultural structure, education, marital status, experience in working and living, are as divergent as human nature itself. They will continue to be a heterogeneous group when they leave the rehabilitation centre, with one obvious difference: they will demonstrate a severe and probably permanent physical impairment (p.115).

III. Previous Research Areas

The literature that has been published in the psychological area of emotional experience caused by a permanent spinal cord injury has focused primarily on three research areas. The first of these areas involves the question of whether there are stages involved in the adjustment to a permanent spinal cord injury.

Interest in the psychological sequelae to a spinal cord injury coincided with advances in medical technology, surgery, and drugs (i.e. antibiotics), which reduced the mortality rate and increased the life expectancy of those sustaining spinal damage (Seymour, 1955). Early on, many writers anecdotally speculated on the adjustment process employing psychological descriptions (Friedland, 1949; Grayson, 1950; Kuhn, 1947; Thom, Von Salzen & Fromme, 1946). Many of these involved phases or stages in the adjustment to a spinal cord injury.

There is a significant variation in how explicitly these stages are described and sequenced, but they are frequently considered to be fixed in order with each stage necessary for successful adaptation (Karney, 1976; Tucker, 1980). Researchers have designed models consisting of two (Guttman, 1976), three (Litin, 1957, Mueller & Thompson, 1950; Stewart, 1977), four (Peter, 1975; Rigoni, 1977) and five (Bracken and Shepard, 1980; Hohmann, 1975; Tucker, 1980) stages. More complex models containing several stages and levels have also been proposed (Bray, 1977, 1978; Dunn, 1975).

One of the first researchers to postulate that there were stages involved in the adjustment to a spinal cord injury was Wittkower and associates in 1954. He felt that the patients' first reaction to their disability is one of denial. The next reaction to follow in the early months of their disability is deep depression.

Siller (1969) feels that anxiety and depression are the most notable reactions to a spinal cord injury and are easily observed. Siller states that if the

> superficial clinical picture suggests an absence of anxiety and depression, a more thorough observation will usually reveal their presence. If a recently disabled person does not seem particularly depressed, this is inappropriate. A person should be depressed because something significant has happened, and not to respond as such is denial (p.292).

Siller also feels that grief and mourning reactions are part of the adjustment to a spinal cord injury.

Kerr and Thompson (1972) think that the adjustment process involves three stages. The first stage involves the reactions of mental shock, fear and anxiety. This is followed by a second stage involving grief and mourning. The third stage entails the emotions of aggression and rebellion. These researchers state that all spinal cord injured patients must go through these stages to adjust mentally to their disability.

Berger and Gavett (1952) feel that certain emotions and behaviours are evident with individuals who have suffered a spinal injury. They are "depression, anxiety, and immature emotional expressions characterized by impulsiveness, explosiveness and egocentric behavior" (p.16).

Mueller (1962) feels that the initial reaction to a spinal injury is one of depression, dependency, autistic thinking and frustration. But within three to six months the patient's pre-injury personality reasserts itself. Mueller therefore suggests that people with spinal injuries all react the same to their situation despite differing pre-injury personalities.

Hohmann (1975) states that the average person who suffers a spinal cord injury will experience a series of emotions when attempting to cope with this situation. The first

emotional reaction to this situation is one of denial which lasts up to two months following injury. Following this state is a period of depression involving "withdrawal and internalized hostility. Next, he externalizes the hostility onto those around him. Finally there is a reaction against dependence. After these reactions have been worked through, there will usually be a reconstitution of the preinjury personality" (p.81).

Weller & Miller (1972) feel that there are four emotional stages involved in the reaction to a permanent spinal cord injury. The stages, presented in the order they are most often seen, are shock, denial, anger, and depression. These researchers feel that the stages may vary in length, overlap, fluctuate back and forth, and, on some occasions, be omitted by individual patients. Weller & Miller (1977) also feel that the term stage "implies a process through which the individual passes to reach the ultimate goal of psychological adjustment to the changed physiological state" (p.372). To the four stages can also be added a fifth, that of "acceptance" or "adjustment", which is usually not reached until much later in the rehabilitation process, generally a few years past the date of injury.

Two researchers in separate studies found no evidence for the stage theory of adjustment to a spinal cord injury. Dunn (1970) failed to confirm the predicted sequence of stages and also suggested that response variability from the patients was the more frequent pattern. Although his results revealed trends, these were modified by the presence of individual differences. Dunn (1970) feels that stage models "make little or no allowance for individual differences in personality, coping styles, or life experiences" (p.912B).

Lee (1983) predicted that spinal cord injured subjects would not react with specific and universal emotional reactions which fall into predictable stages of response, as most theoretical perspectives assume. The results revealed a high variability in subjects' reports of anger, depression, anxiety and happiness. This "variability was not mediated by the severity

or permanence of the patients' condition" (Lee, 1983, p.3415B). No support was provided for a stage model of emotional response.

The implication that individuals who suffer a permanent spinal cord injury must pass through a series of specific stages strongly suggests that the injury itself is the primary factor influencing post-injury behaviour. As a result, "premorbid personality characteristics and postinjury situational differences, which might allow for variation in the presence or sequencing of reactions, are considered secondary to the injury itself in determining postinjury behavior" (Frank *et al.*, 1987, p.613).

Many researchers (Wright, 1960; Mueller, 1962; Siller, 1969; Shontz, 1971; Hohmann, 1975; Cook, 1976) acknowledge and emphasize premorbid personality differences and two of these researchers (Mueller 1962; Hohmann 1975) state that the preinjury personality will reassert itself after these stages are dealt with. This necessarily leads to Trieschmann's (1980) logical analysis that if there are

> ... many personality styles among persons with cord injury, why must one assume that all will react to the onset of a disability in the same manner? Why must we assume that the injury will lead to a suspension of one's typical pattern of responding for a period of six months? Have professionals, in clinical interactions, placed disabled persons in a "Catch 22" position? If you have a disability, you must have psychological problems; if you state that you have no psychological problems, then this is denial and that is a psychological problem (p.46).

Obviously a spinal cord injury is a very traumatic event in the average person's life, yet it seems that researchers have heavily emphasized the negative emotional aspects while at

the same time ignoring the inner strengths and ability to cope that people in crisis possess when adjusting to a permanent disability.

Part of the confusion and the reason why certain aspects of the emotional reaction to a permanent spinal cord injury are emphasized is that recent writers (e.g. Bracken & Shepard; Tucker, 1980) have based many of their concepts and arguments on earlier opinions (e.g. Nagler, 1950; Siller, 1969; Wittkower *et al.*, 1954) without critically analyzing this research or examining more contemporary alternative explanations. It appears that paradigm expectations have influenced these non-empirical reports (Trieschmann, 1980). It is possible that the expectations of the researchers of these studies had a greater influence on their descriptions of post-injury behaviour than the actual subject behaviour. Such expectations may bias clinical observation and result in a distortion of the reported incidence of the stages of adjustment.

Silver and Wortman (1980), in an extensive review of stage models of adaptation to a variety of events, including spinal cord injuries, observed that these models appealed to clinical intuition. It would be convenient, for example, to expect a routine, predictable sequence of reactions from a recently injured person. However, "empirical studies of adaptation to stressful events do not reveal a consensual pattern of reactions; instead, they underscore the impact of individual differences in perception, coping and adjustment" (p.613).

Finally, Trieschmann (1980) feels that the vast majority of the research describing the stages of adjustment to a permanent spinal cord injury are based on clinical impressions and added to this confound, few, if any, of the articles present data to document the existence, sequence or duration of these stages.

The second research area focused on in terms of the emotional experience caused by a permanent spinal cord injury is related to, and was briefly mentioned as part of the

discussion of the first research area. This was the question of whether there is a pattern of depression after a permanent spinal cord injury and if not, does this imply a denial of disability.

Depression has been considered to be one of several common, expected reactions to a permanent spinal cord injury (Burnham & Werner, 1979; Mueller, 1962; O'Connor & Leitner, 1971; Weller & Millar, 1977). This perspective maintains that depression is a prerequisite for satisfactory adjustment (Nagler, 1950; Nemiah, 1957). Depression would invariably take place some time after the spinal cord injury. This contention was supported by early research done by Wittkower, Gingras, Mergler, Wigdor, and Lepine (1954), who found that all 50 subjects in their sample evidenced deep depression in the early months following injury. Siller (1969) felt that depression was therapeutic and the absence of a depressive reaction by a spinal injured individual was evidence of denial of the disability. Nemiah (1957) has specifically stated that one must confront the spinal cord injured individual with "the reality of his situation and force him into a period of depression while he works out his acceptance of his loss" (p.146). In other words, denial is seen as a maladaptive defense assumed to be present when depression is absent.

Tucker (1980) believed that patients who experienced an initial depression had a better prognosis for rehabilitation. Bracken and Shepard (1980) considered depression to be a normal coping reaction, although they argued that an extended period of depression impairs adjustment. Dunn (1975) thought depression was a hindrance to successful rehabilitation. Both Hohmann (1975) and Stewart (1977) argue that depression follows a period of denial.

Various researchers have criticized the above mentioned studies with the reaction of depression to a permanent spinal cord injury due to the absence of empirical validation and poor operationalization of constructs (Cook, 1976; Woodbury, 1978). Conceptualizations

underlying these models are not based upon or related to contemporary theories of depression (Woodbury, 1978). The frequent and often unsophisticated use of "depression" as a reaction is problematic because of the failure to utilize reliable diagnostic criteria. Consequently, these studies do not allow for a differentiation of clinical depression from grief or mourning (Howell, Fullerton, Harvey & Klein, 1981). Depression and mourning are "different processes and should not be confused in rehabilitation settings" (Howell *et al.*, 1981, p.284).

Despite such shortcomings, impressionistic reports have built a set of assumptions that have guided rehabilitation efforts in spinal cord injury. Foremost among the assumptions guiding rehabilitation is the expectation that most patients experience a period of depression during rehabilitation. Depression was "viewed as a coping mechanism which signalled acceptance of the disability; depression facilitated rehabilitation and adjustment" (Frank, Elliott, Corcoran and Wonderlich, 1987, p.614). The following are empirical studies of depression and/or denial as reactions to a permanent spinal cord injury.

Bourestrom and Howard (1965) compared the MMPI profiles of three disability groups: rheumatoid arthritis, multiple sclerosis and spinal cord injury. They found that the "group with the spinal cord injury had the most benign profile, suggesting less emotional distress, the least anxiety and the least concern with somatic problems. Characterological defects often ascribed to such persons were not substantiated by the results" (p.626).

Taylor (1967) examined a group of persons who had suffered a spinal cord injury within a month of this injury and described the MMPI profiles of this group. The "profiles were similar to that of a random sample of male university students with evidence of only very mild depression. There was no evidence of marked depression, anxiety, or psychotic mentation in his sample" (Trieschmann, 1980, p.48).

Klas (1970) did a longitudinal study of four persons who were rendered quadriplegic due to a permanent spinal cord injury. He found that there was no consistent relationship between depression and performance in the rehabilitation process. Interestingly, Klas also found that the rehabilitation staff most often rated these patients as more depressed than the subjects' self-ratings.

Howell *et al.* (1981) assessed 22 patients who had been injured for six months or less. The researchers used the Beck Depression Inventory (Beck, Ward, Mendelson, Mock & Erbaugh, 1961). Each patient was interviewed within one week of admission and filled out the questionnaire at weekly intervals. A minority of the patients (22.7%) experienced some depressive disorder. This percentage was higher than what would normally be found in a survey of an urban community (5.7%) (Weisman & Myers, 1978). However, this percentage was much less than expected by those who argue that depression is experienced by all patients with permanent spinal cord injuries.

Fullerton, Harvey, Klein & Howell (1981) examined the pattern of depression of 30 patients who had suffered a permanent spinal cord injury. Nine patients qualified for a depressive disorder which had developed after the injury. Eight of these developed depressive episodes within one month of injury, while another subject did not evidence depression until three months after the injury. All depressive episodes were mitigated by the time of discharge.

Results of a recent study by Frank, Kashani, Wonderluch, Lising & Visot (1985) were consistent with these investigations. Thirty-two patients were evaluated with a semi-structured interview that permitted diagnosis by DSM-III criteria. Fourteen (44%) of the patients met criteria for a depressive episode. Eighteen (56%) did not meet criteria for affective disorder. Fourteen subjects were currently depressed, and six had a history of depression. This sample

corroborated the results of the Howell *et al.* (1981) and Fullerton *et al.* (1981) studies, supplying strong evidence that depression is not universal following a permanent spinal cord injury.

Various researchers have found very little evidence for the theory that an absence of depression implies a denial of a permanent spinal cord injury. McDaniel and Sexton (1970) observed 35 patients throughout their rehabilitation using ratings of stressful events and hormonal measures of stress. The most stressful periods occurred at admission and discharge. Both depression and denial remained constant over all stress periods, but "no clear patterns were identified over four critical events studied. Depression was clearly independent of acceptance of loss" (p.177).

Cook (1979), who used a shortened version of the MMPI with 118 clients, found that only two patients met the criteria for reactive depression and approximately 68% of the entire sample did not appear to be even mildly depressed. In contrast, they discovered that 34% of the patients had scores which indicated evidence of the use of denial.

Dinardo (1971), in a doctoral dissertation, examined the thesis that the absence of depression does not have to imply the denial of a spinal injury thus leading to maladjustment. Individuals whose "emotional response styles predispose them to depression as a reaction to spinal injury will have greater difficulty in adjusting to the disability than those who do not display such a response style. Those who reacted with depression were less well adjusted at any given point in their rehabilitation than individuals who did not react with depression" (Trieschmann, 1980, p.52).

Dinardo concluded that just because there was an absence of depression does not mean that there was a denial of disability or a subsequent tendency towards maladjustment in the person who suffered a spinal cord injury.

Malec and Niameyer (1983) found scores on measures of psychological distress correlated with length of stay and lower self-care ratings among 28 patients. Two measures of depression—the depression scale on the Derogatis Symptom Check List (SCL-90; Derogatis, 1977) and the BDI (Beck *et al.*, 1961)—were significantly predictive of length of stay, accounting for 40% of the variance. These measures were also predictive of self-care of bladder and skin at discharge. Patients who were "most depressed and distressed in general tended to require longer periods of rehabilitation and had lower levels of desirable self-care behaviors of disability for proper health" (p.359).

Lawson (1978), in a comprehensive study, tackled the question of whether there was a specific period of depression following a spinal cord injury and whether or not there was any occurrence in the rehabilitation process that was related to a depressive or elative effect. Ten persons with quadriplegia were studied five days a week for their entire rehabilitative stay. Lawson had each of these individuals keep a daily record of their emotional reactions to the day's events. The depressive effect was measured in four ways: daily self-report to a semantic differential by the patient; behavioural measure of the number of words per minute during the first three minutes of their daily taping session; daily average of semantic differentials rated by four staff members; endocrine measure of daily output of urinary tryptamine, which is a metabolic end-product thought to parallel the course of depression. The results revealed that there were no clear periods of depressive effect, in that none of the patients had extended depressive periods in which 70 percent of the measures were in the depressive range. The scores of these patients with quadriplegia were similar in average and range to scores for able-bodied, non-depressed persons.

Thus, the conclusion reached after reviewing the literature is that a permanent spinal cord injury does not necessarily lead to severe depression in all patients, and the absence of

depression does not imply a denial of disability or inadequate adjustment to this physical impairment.

The third research area focused on is whether a permanent spinal cord injury, which leads to the disruption of the autonomic nervous system and its afferent return, causes notable changes in experienced emotional feelings.

Hohmann (1966) conducted one of the first studies to try to provide some insight into this question. Structured interviews were conducted with 25 males who had suffered permanent spinal injuries at various levels. These subjects were asked to compare their emotional feelings before and after their injury. Hohmann found that "individuals with cervical and high thoracic lesions reported a marked reduction in feelings of sexual stimulation, fear, and anger. In persons with lower thoracic and lumbar lesions, there was a moderate to mild reduction in these feelings" (p.154). Oddly enough, almost all individuals reported a significant increase in emotional feelings related to sentimentality. Also, even though these men reported a reduction in experienced emotional feelings, they tend to display overt evidence of emotion because society seemed to expect it of them. Therefore they tended to be more emotional than they actually felt.

Thus Hohmann's results are offered for the belief that disruption of the autonomic nervous system and its afferent return will cause disturbance in the mental correlates of emotion and that the more extensive the disruption, the greater the decrease in some emotional experiences.

Jasnos and Hakmillan (1975) also tested the theory that disruption of the autonomic nervous system and its afferent return caused by a permanent spinal injury will cause disruption in emotional experiences. They tested 24 male subjects who had suffered severe damage to the spinal cord resulting in complete motor and sensory paralysis. The subjects

were classified in three categories on the basis of lesion level: cervical, thoracic and lumbar; 8 in each group. Subjects were asked to mentally imagine themselves to be in one of four sets of situations that were seen on slides and to describe their feelings for each set. It was found that less intense feelings of arousal were expressed by subjects with higher (cervical) lesions than by subjects with lower (thoracic and lumbar) lesions when the three groups viewed slides of nude women. It was also found that expressed arousal to a high emotion-relevant situation (imagine being alone with a sexually available woman) and to a low emotion-relevant situation (a male showing a picture to a group of friends) was similar among subjects with cervical lesions but differentiated in those with lower lesions.

Both Hohmann's plus Jasnos and Hakmillan's results are used by Schachter (1966) to support a peripheral theory of emotion. This theory places great importance on the proprioceptive and visceral feedback for the subjective experience of emotion. It assumes that actual bodily changes are necessary for the occurrence of corresponding changes in emotional feeling. As the site of spinal damage increases toward the cervical region, it would be expected that the extent of awareness of peripheral arousal would decrease, leading to a corresponding decrease in emotional experience.

In opposition to the peripheral theory is the centralist theory which assigns bodily feedback a minor role, maintaining that experienced emotion is exclusively a central (cortical) process. The main proponent of this theory is Cannon (1927), who felt that affective experience arises in the central nervous system without reference to peripheral visceral circumstances.

Linton (1973) studied the centralist theory of emotion by giving two groups of subjects bogus information regarding their heart rate while they viewed and judged slides of sexual

content. The first group consisted of 20 able-bodied subjects with muscular and visceral feedback mechanisms intact.

The second group consisted of 20 disabled subjects (quadriplegics) whose ability to experience bodily feedback was radically reduced due to their injury. The centralist theory predicted that there would be no difference in overall ratings of sexual slides; that is, both groups would equally experience emotional arousal. Further, this theory predicts that differing levels of false heart rate feedback should not produce differing results between the two groups. The findings supported the centralist theory for both hypotheses rejecting the peripheralist theory.

Hahnstadt (1986) also studied the controversy between the peripheralists and centralists about the role that autonomous function plays in emotion. The study tested the prediction that height of spinal cord injury would be positively related to reduction in emotional responsiveness.

Three groups of 12 male veterans with functionally complete lesions at the cervical (C4-C7), cervical-thoracic (C8-T5), and thoracic-lumber (T6-L2), and a group of 12 able-bodied male veterans were studied. Able-bodied subjects were matched to subjects with spinal cord injuries on age and education level. Self reports of affective arousal were recorded while subjects imagined personal incidents of anger, fear, joy and sentimentality. In addition, subjects made comparisons of the intensity of each of the four emotions as generally experienced in the present with that generally experienced in the past. Measures of the degree of emotional arousal in currently experienced incidents of anger, fear, joy, and sentimentality during a one week period were also obtained.

Hahnstadt's results showed that the reports of subjectively experienced arousal for each imagined incident did not vary as a function of spinal cord injury. Comparison ratings of

"present versus past experienced intensity of anger, fear, joy and sentimentality were not affected by level of injury, nor was lesion level related to the degree of intensity experienced during current incidents of the four emotions" (Hahnstadt, 1986, p.97).

The conclusion reached was that individuals with spinal cord injuries do not subjectively experience emotion differently than do able-bodied individuals.

Nestoros, Demers-Desrosiers and Dalicandro (1982) found no differences between 19 quadriplegic and 16 paraplegic patients when comparing their Zung self-rating scales for depression and anxiety. They felt that the level of the spinal cord injury had no impact on the experience of these emotions.

Chawlisz, Diener & Gallagher (1988) interviewed spinal cord injured, other handicapped, and non-handicapped subjects to investigate the relation between the perception of autonomic arousal and experienced emotion. Their findings indicate that the perception of autonomic arousal is not necessary for emotional experience. They found that spinal cord injured persons with the most limited bodily feelings often reported feeling several emotions more intensely than before their injury. A majority of the spinal cord injured subjects reported increases in the intensity of feelings of love, joy, sentimentality, and sadness in their lives. Furthermore, spinal cord injured persons significantly more often reported increases in the intensity of fear than those in the other groups. It seems unlikely that if "autonomic arousal feedback were critical to emotional experience that people would experience many emotions more strongly even after such feedback had declined greatly" (p.825).

Lowe and Carroll (1985) interviewed 29 individuals, 21 men and 8 women, who had all suffered spinal cord lesions resulting in motor and sensory paralysis to test whether the intensity of their experience of 8 common emotions had decreased, increased or stayed the same since injury.

Subjects were interviewed individually and presented with a series of 8 common emotional states: affection, anger, enjoyment, excitement, fear, grief, guilt, and hate. Each subject was asked to imagine situations in which these 8 emotions might have been experienced recently and before their injury and to compare the intensity of feeling. As with Hohmann, the relative strength of their emotional experiences was noted under the same five response categories: "greatly decreased", "decreased", "no change", "increased", "greatly increased". There was also an "unable to make a comparison" category.

The results revealed that there were

> ... no significant differences in effects of any sort for 6 of the emotions: enjoyment, excitement, grief, anger, fear and hate. For affection, there were more people reporting an increase than a decrease in the intensity of emotional experience, and more people reporting no change than a decrease. For guilt there were more people reporting no change than a decrease
>
> (Lowe & Carroll, 1985, p.136)

Lowe & Carroll then compared the responses of the 16 cervical lesion subjects with those of the remaining 13 (12 thoracic and one lumbar lesion). No significant "differences emerged between the pattern of judgements for the two subgroups for any of the 8 emotions" (p.136).

These researchers note that their results are at odds with Hohmann and as such argue against the peripheral theoretical perspective which accords visceral sensations a crucial role in emotional experience. Their explanation for this discrepancy is that Hohmann's research was undertaken in the late 1950s, when the average length of hospitalization was in terms of years and the message communicated to spinal injured persons as to their living a relatively normal life outside of an institution was very bleak. Since the time of Hohmann's study,

there have been tremendous advances in the rehabilitation and aftercare of spinal injury patients, especially with the introduction of specialized spinal care units. With these advances, Lowe and Carroll's subjects are given and possess much more positive attitudes about themselves and their future. In short, Hohmann's reports of a "reduction in affective tone may have been the result of a discouraging outlook rather than a disrupted nervous system. As prospects improve, so the diminution of emotional experience disappears" (Lowe & Carroll, 1985, p.136).

The conclusion reached after reviewing the literature is one of ambiguity. Depending on the particular researcher, a permanent spinal cord injury may or may not cause notable changes in experienced emotional feelings.

IV. Psychosocial Aspects of Post-Injury Emotional Reactions

An important consideration in any study of the emotional reactions to a permanent spinal cord injury is the manner in which it is analyzed; that is, is it subjectively or objectively researched, what type of method was used, in what sort of setting was the test administered, and who administered the test. Several studies have found that staff overestimate the emotional reactions and the level of distress patients experience (Klas, 1970; Lawson, 1978; McDaniel & Sexton, 1970; Taylor, 1967). In a study done by Bodenhamer, Achterberg-Lawlis, Kevorkian, Belanus, and Cafer (1983), it was found that professional caregivers working with spinal cord injured people typically overestimate depression and social discomfort while underestimating the anxiety and optimism of their patients. Furthermore, accuracy amongst these professionals was negatively correlated with clinical experience, suggesting that more experienced professionals tend to develop painful and depressive empathic feelings toward the people they treat (Bodenhamer *et al.*, 1983).

In a similar fashion, Ernst (1987) found that experienced professionals have been shown to exaggerate the distress of their spinal cord patients, and these misperceptions tend to progressively worsen with length of clinical experience. Staff members "tended to over-estimate depression, anxiety, and social discomfort while under-estimating the optimism of their spinal cord injured subjects" (p.13). Ernst states that despite limited empirical validation at best, the stage theory has not only enjoyed an unchallenged popularity amongst rehabilitation professions, but has often been imposed upon new spinal cord injured patients as a necessary criterion for hospital discharge.

Caplan (1983) found that social workers, and Mason & Muhlenkamp (1976) found that other groups of health practitioners, rated patients as more distressed than the patients rated themselves. Other studies indicate that positive feelings may be interpreted as denial, and that

anger that is realistically directed at some aspect of care may be discounted and interpreted as evidence that the patient is "at the angry stage". The influence of situational factors on patients' moods is underestimated (Lawson, 1978).

Various researchers have found that depression is overdiagnosed in rehabilitation settings, and this is apparently due to the use of subjective rather than standardized criteria (Gans, 1981). Health caregivers perceive patients who are paraplegic and depressed as behaving more typically and responding more appropriately to their condition than optimistic paraplegic patients (Westbrook & Nordholm, 1986). Rehabilitation staff ratings of depression vary considerably across disciplines (Caplan, 1983). Furthermore, patients have indicated that they are aware of staff expectations to be depressed and have responded with experiences of depressed, hostile, and angry affect (Cook, 1976; Gans, 1981; Hohmann, 1966; Lawson, 1978).

Several plausible explanations may account for the disparity in patient and staff perceptions of mood and adjustment. Scott (1970) argued that rehabilitation personnel construct theories about what it means to be disabled, and that such professional ideologies are used to interpret and shape patients' behaviour. He also feels that most "theories are cast in psychological terms. In them, the focus is on the impact which the disability is thought to have on personality and psychological adjustment" (p.260).

Trieschmann (1980) applied Wright's (1960) concept of the requirement of mourning as a possible explanation of the almost universal perception of depression as a reaction after injury. Wright (1960) believes required mourning occurs when a person feels compelled to protect his/her value system in the presence of a person with a disability. This is accomplished either "by a) insisting the person with the disability is suffering, or b) devaluing the person if suffering is not evident, because the person should be distressed and is not" (pp. 242-243). As a result, clinical observations may be influenced by the clinician's requirement

that a patient with a spinal cord injury be depressed, and the absence of depression suggests that the person is in the process or stage of pathological denial.

Rehabilitation staff frequently observe "anxiety, sadness, excess fatigue, pessimism, and sleep disturbance in the average spinal cord injured patient", yet despite these many non-empirical descriptions of depressive symptoms, no study has delineated common, salient depressive features within this group (Frank *et al.*, 1987, p.622).

V. Theoretical Review

There are many theories of emotion. They stem from various fundamental assumptions, they emphasize different problems, and they can be distinguished both in the degree of their formality and in the degree to which they are anchored to empirical fact. Not all theories of emotion are described, since that would necessitate a thesis in itself. Those included have been chosen because they are centrally important to modern thought in emotion and/or because they are directly relevant to the relationship between emotion and imagery.

1. Physiological Theories

a) James-Lange Theory.

The James-Lange theory began by limiting the field of consideration to those emotions which have a distinct bodily expression. They were attempting to distinguish between mental processes which had no obvious physiological concomitants and those in which straightforward, easily observable changes occur (Strongman, 1973). This theory of emotion (Lyman, 1980) asserted that the "emotional experience, or feeling state, or conscious part of the emotion, is the awareness or feeling of the physiological changes taking placing during the emotion" (p.98). More simply, the mind is aware of the physiological changes produced by the physical functioning of the body.

Lyman (1980) states that if the James-Lange theory were correct, severing the connections between the viscera and the cortex should prevent the occurrence of any emotional experience with the exception of those which are dependent upon changes in the musculature. But, when those connections are severed, the emotional experience still occurs. Evidence from cases like this in which the connections have been severed suggest that the James-Lange

theory is not entirely sound. Emotional experience occurs even when the connections between the viscera and the cortex no longer exist.

Secondly, superficial self analysis from daily experience indicates that the sequence which the James-Lange theory proposes does not always occur. As Lyman (1980) notes, sometimes the emotional experience seems to precede the physiological changes, while on other occasions it seems to follow them. Self-inspection and phenomenology give conflicting evidence in which the physiological changes seem to precede or to follow the emotions.

More positively, the James-Lange theory did produce the first view which assumed the existence of discrete emotions.

b) Cannon-Bard Theory

Apposition to the James-Lange theory is the Cannon-Bard or Hypothalamic theory of emotion. This theory (Strongman, 1973) suggests that the neurophysiological side of emotional expression is subcortical, or, more particularly, thalamatic.

The Cannon-Bard theory of emotion (Lyman, 1980) states that when there is stimulation some "impulses go directly to the cortex, the hypothalamus, the musculature, and the viscera, and some impulses go to the cortex from the musculature, viscera and hypothalamus" (p.99). If the neural impulses take these pathways, it becomes apparent that the emotional experience, in so far as it is dependent upon activity in the cortex, hypothalamus, musculature and viscera, can, on occasion, precede the physiological changes, can occur concurrently with the physiological changes or can follow the physiological changes.

More recent evidence indicates that even though the hypothalamus is important in emotional behaviour, it should not be over-emphasized. In natural situations emotional behaviour and experience seem to be related to an integrated action of the nervous system (Lyman, 1980).

The Cannon-Bard theory pictured the neurophysiological system as much simpler than is now understood. Credit must be given to this theory, though, for drawing attention to the neurophysiology of emotion and hence acted as the progenitor to a great deal of research and theory (Strongman, 1973).

2. Instinct Theories

a) Freudian Theory

Freud focused his attention on a human's sexual impulses or libido in his theory of emotion. He postulated that the sexual impulse is instinctual, experienced as an emotion and leads to action.

Freud (Arnold, 1960) thought that the libido or sexual drive is a constant force that can become attached to many different objects in the course of life. It is not the object that arouses the instinct, but the instinct itself that directs the choice of object. The aim of the "libido is pleasure, and pleasure is equated with quiescence: the instinct has reached its goal and has come to rest" (Arnold, 1960, p.134). It follows that excitation is equated with stress. From this, Freud assumed that there was some defence against any excitation, whether occurring internally or externally. This defence (Arnold, 1960) is accomplished by the superego, which uses instinctive aggressive actions against the libidinal urge. The instinct of aggression (death instincts) works in opposition to the erotic instinct, an opposition, Freud feels, is deeply rooted in evolutionary history.

Freud found nothing strange in the apposition. The "erotic instinct tends towards life, yet finds its goal in quiescence, and ultimate quiescence is death. The aggressive instinct tends toward destruction and death, yet promotes life by attacking anything that obstructs activity" (Arnold, 1960, p.136).

The twin emotions of love and aggression arise through the experience of autonomic excitation, induced by ideas in the unconscious. According to this view (Arnold, 1960), the pleasure principle uses autonomic innervations as discharge channels for instinctual tensions, while the reality principle governs such discharge over the motor system. This effect becomes a pleasurable alternative to action, to be indulged in when action is impossible. The problem with this theory of emotion as "affect change or an alternative for action" is that it does not properly explain an emotion which occurs when there is no desire for action, therefore no instinctual energy cathecting an object.

Anxiety or fear has always held a primary place in Freudian theory. Freud, as he realized the inconsistencies in his earlier theories for love and hostility, also changed his views so that anxiety was no longer seen as a reaction to obstructed libido. Anxiety, as other emotions, was now viewed more as a form of safety valve than as a reaction to external events.

The difference between anxiety and the other emotions (love and aggression) is that anxiety is newly aroused each time a dangerous situation is perceived. Love and hostility, on the other hand, "are instincts with an affect charge which are continually active" (Arnold, 1960, p.139). Freud never felt comfortable with this separation and in later years stated that "all emotions should have the same status; they would all have become expressions of instinctual drives" (Arnold, 1960, p.139).

b) McDougall's Theory

McDougall (Strongman, 1973) felt that all behaviour stems from seeking food and escaping or avoiding noxious stimuli. He argued that what we call emotions and feelings occur as "adjuncts to these basic processes; they come from the way in which we perceive our environment and our various bodily changes" (p.17).

McDougall proposed that two feelings, pleasure and pain, direct all of man's goal-directed behaviour. However, he also thought of man as much more complex, he has intricate cognitive abilities which set him apart from other organisms and, therefore, no longer just "alternates between pleasure and pain but continually ranges over a complexity of feelings" (Strongman, 1973, p.17). Through everyday experience these complex feelings become known as various emotions.

McDougall thought that instinct provides the force for all thought and action. All instincts have "knowing, feeling and striving components, with some emotional excitement in evidence as well. He suggested that this emotional facet of instinct is reflected by discrete visceral and bodily changes" (Strongman, 1973, p.17). McDougall felt that emotions can be separated from the cognitive processes which go with them. He was insinuating that perception triggers emotion.

McDougall's (Arnold, 1960) outline for emotion began with the idea that throughout the "evolution of man, goals became more specific and goal directed behaviour became more specific. The result was more precise and particularized bodily adjustment. Through experience of each of these well-differentiated strivings, gave the clear quality of a "primary emotion" (p.131). McDougall also felt that if two or more bodily reactions conflict, the consequence is a secondary or blend emotion such as joy or sorrow.

3. Behaviouristic Theories

All behaviouristic theories of emotion are based on biological drives. The behaviouristic theorists Watson, Skinner and Hull all state that emotion is a modification of drive. For Watson (Arnold, 1960) emotion is a "hereditary 'pattern reaction' involving profound changes of the bodily mechanism as a whole, but particularly of the visceral and glandular system"

(p.149). Watson feels that there are three innate emotional patterns: anger, fear, and love. These are stimulated in the newborn by restraint (anger), loud sounds (fear), and stroking (love). Over time, these instinctive patterns are altered over the course of development. In adulthood, emotion is identified through the facilitation or inhibition to responses.

Both Hull and Skinner's formulations are relatively close to Watson's. Skinner feels that emotion represents alterations in reflex strength. Hull does not use the "concept of emotion but apparently subsumes it under increase and decrease of drive strength" (Arnold, 1960, p.149).

Millenson (1967) provides the closest approximation to an updated behaviouristic theory of emotion. His fundamental assumption is that emotional changes arise through a process of classical conditioning which either enhances or suppresses other, nonemotional behaviour. Millenson (Strongman, 1973) argues "that: 1) some emotions differ only in intensity; and 2) some emotions are basic and others are compounds of these. From this Millenson produces a three-dimensional system to describe all emotion, each dimension representing variations in emotional intensity" (p.27). The first dimension involves the emotions terror, anxiety or apprehension, and these emotions sometimes suppress and sometimes facilitate operant behaviour. The second dimension involves the emotion of elation or pleasure which enhances operant behaviour. The third dimension involves anger which facilitates some operant behaviour and increases the probability of attack and destruction.

Millenson states that more complex emotions develop from mixtures of these three dimensions, which he regards as primary. He also feels that human emotional reactions develop their complexity through a very involved history of conditioning and reinforcement which all people have.

4. Cognitive Theories

A number of contemporary theories treat emotion essentially as a response or as a complex of responses determined by cognitive processes. These theories are based on ideas about human nature put forth by early philosophers such as Aristotle and Kant. These ideas are: "1) man is first and foremost a rational being; 2) rationality is basically good, 3) reason (cognitive processes) should be used as a control and as a substitute for emotion" (Izard, 1977, p.31).

The most comprehensive theory of emotion in this tradition has been developed by Arnold. She feels that emotion results from a sequence of events described by the concepts of perception and appraisal.

Arnold used the term perception to mean "simple apprehension of an object". To apprehend something is to understand what it is like as an object, independent of any effect on the perceiver. Emotion is separated from appraisal, but it may be included as a necessary part.

The fine distinctions (Izard, 1977) between emotion, perception, and appraisal were maintained even though the "appraisal itself was characterized as direct, immediate, and intuitive. Appraisal is not the result of reflection or deliberation, but it is almost as direct as perception" (p.31). Appraisal directly follows and completes perception and can only be realized as a different process through reflection.

> The sequence perception—appraisal—emotion is so closely knit that our everyday experience is never the strictly objective knowledge of a thing; it is always a knowing-and-liking, or a knowing-and-disliking ... The intuitive appraisal of the situation initiates an action tendency that is felt as emotion,

expressed in various bodily changes, and that eventually may lead to overt action (Arnold, 1960a, p.177).

Emotions contain important continuing effects. Action tendencies which arise with an emotion have the tendency to organize and bias later perception and appraisal. Further, intuitive appraisal and emotional response have a sense of constancy, so that the "object or situation so appraised and responded to tends to evoke this appraisal and response for all times to come" (Arnold, 1960a, p.184). Also, the appraisal and emotion response to a particular object will have the tendency to generalize to the whole class of objects.

Arnold's theory also draws a number of distinctions between emotion and other motivational concepts. She maintained that emotion is distinct from biological drives. More importantly, Arnold made a distinction between emotion and motive. Emotion is a "felt-action tendency, while a motive is an action impulse plus a cognition" (Arnold, 1960a, p.233). Thus, motivated action is a function of both emotion and cognitive processes. A motive seems to be an "action impulse (a want) that is appraised as good for action" (Arnold, 1960a, p.233). This want is typically an emotion, and the wanting becomes a motive "when we endorse it and let it lead us to action" (Arnold, 1960a, p.238). Thus an emotional motive, action impulse plus cognition, develops only after the emotion has been favourably evaluated.

5. Kinaesthetic Feedback Theories

Izard (1977) states that emotions are mainly reflected in facial responses, the feedback from which, if it is subconscious, can be rewarding or punishing. There are organized patterns of facial responses which are innate and which are triggered by subcortical mechanisms in the central nervous system. Emotions are also reflected in bodily responses but they play a less significant role than the facial expressions.

Izard regards emotions as one of five interrelated subsystems of personality. There are nine fundamental innate and unique emotions which produce the main human motivational system. These emotions are: interest, enjoyment, surprise, distress, disgust, anger, shame, fear, and contempt. Izard (Strongman, 1973) maintains that these "emotions are discrete on a subjective, neurochemical and behavioural level, but their particular discretion comes from feedback through facial and bodily activity. (Strongman, 1973, p.48).

Izard (1977) suggests that all emotions have the shared characteristics of being noncyclical, having unlimited generality plus the flexibility to be motivators, and influence drives and other personality subsystems.

Izard (Strongman, 1973) describes three person environment and five intraindividual processes which he feels can activate emotion. The person environment interactions are:

> 1) Obtained perception; this follows stimuli from selective activity of the receptors or sense organs. 2) Demanded perception, in which an environmental/social event demands attention. 3) Spontaneous perception, which is the indigenous activity of a perceptual system"
>
> (p.48)

The intra-individual processes are:

> 1) Memory 2) Imagination 3) Proprioception of facial postural or other motor activity 4) Endocrine and other autonomic activity which affects neural or muscular mechanisms of emotion 5) Spontaneous activity of any or all of the neuromuscular systems (p.48)

Finally, Izard (1977) states that once an emotion has begun, the further stages are dependent on the place and nature of the original activity. There is no fixed order to these stages, plus there are a great many possible mechanisms and interactions involved.

6. Gestalt Theory

The Gestalt theory (Waters, 1983) of emotion views the emotional meaning as inherent in the stimulus pattern which is not given by the past experience of the experiencer. There is an "isomorphic correspondence between the structure of the stimulus pattern, and the structure of the experience; and the meaning of the experience is inherent in the structure" (p.46). More simply, emotional meaning is an integral part of the perceptual process—immediate, unmediated, and uninterpreted (Kreitler and Kreitler, 1972).

Gestalt theory (Gabor, 1968) states that the primary configurations which result from perception may be referred to as "images", the recurrence of the same in a different context as "secondary impressions", and the combination and recombination of both as "imagery". Accordingly, imaginations may be reproductive (recurrence of the same pattern of images) or productive (reconstructive of a pattern of images from the old image elements). In general, while the "foreimage", as the sign serving to conjure the image, precedes the elementary image, and while the "afterimage", as the recurrence of the impression of the image, follows it, nevertheless both form, together with the original image, the elements of retrospective imagination. Images "are not 'abstract entities', since the imagination itself is a function of the epistemological coordinates of space and time, and therefore the imagist type of thinking necessarily remains concrete" (p.176). This type of thinking, to apply the analogical terminology of Price (1953), may be described as "tied thinking", in contrast to the "free thinking" of the conceptual type, for it remains tied to the qualitative texture of the objects of thought.

Gabor (1968) thinks one of the major questions that must be answered by Gestalt theory is: What holds the train of imagery together, that is, what determines that this image

must follow that image rather than any other, since, as previously noted, imagery involves a combination of representative images. Gestalt theory uses the classic psychological term of "association" to answer this question but with a radical reinterpretation. In the new context, since the images themselves are considered to be configurations, association becomes a process of structural reintegration. It follows that associative integration, like all structural reintegrations, has its own laws which are susceptible to objective description in the Gestaltian tradition.

It is well known that the eidetic imagery of children, whether pictorial or literary, is distinctive in being striking. The "imagination of children, in the absence of the abstract schemata of thought, manifests a spontaneity which is unlimited by a conceptual boundary" (Gabor, 1968, p.177).

In this manner it may be stated that the imagist type of thinking may take place in "the absence of, or with a minimum of, the conceptual and hypothetical types of thinking" (Gabor, 1968, p.179). In general, however, the various types of thought processes go on in the subject in combinations of various proportions.

In the Gestalt theory of emotion there is a strong relationship between imagination and emotion. The imaginist type (Gabor, 1968) of thinking exercises a pervasive power over the genesis of emotions. The whole family of emotions "feeds upon" imagination.

The Gestalt theory builds upon the James-Lange theory of emotion which states that emotions do not precede bodily changes but succeed them. It builds upon it, in that "bodily changes, to the extent that they result in the diffusion of energy, give rise to an emotional state. But it is always the image of bodily changes that intensifies the emotions. Emotion, once started, feeds upon imagination" (Gabor, 1968, p.179). An example of this is the aesthetic experience, which generally takes place in the presence of the aesthetic object, which

would be deprived of the greater portion of its emotional content if the perception of the object was to somehow fail to produce the imagery associated with it. Imagination appears to be a necessary condition of emotion. Given a "train of images", the emotions quickly awaken and follow in their terrain. In the final analysis, the "genesis of laughter and crying alike may be attributed to the formation of an image cycle whose apogee marks the degree of our involvement in the reality of the image world" (Gabor, 1968, p.180). Careful psychological introspection attests to this fact.

7. Experiential Theory

The Experiential theory of emotion uses a Gestaltian approach as its basis. The Gestalt theory (Waters, 1983) as stated previously, views emotional meaning as inherent in the structure of the stimulus pattern which is not given by the past experience of the experiencer. There is an "isomorphic correspondence between the structure of the stimulus pattern, and the structure of the experience; and the meaning of the experience is inherent in the structure" (p.46). A square printed in a scene does not have to be learned in order for it to be separated from its background. Wundt (Murphy & Kovach, 1972) hypothesized that emotion is a function of the pattern of sensation, from which he thought images were derived.

The Experiential theory of emotion (Lyman, 1982) defines emotion as a conscious experience characterized by a dynamic pattern of imagery and accompanying affect and by particular experiential themes. The three affective dimensions are: pleasant/unpleasant, excited/depressed, and tense/relaxed. These dimensions are themselves a function of the stimulus, which can be either within the body or outside it.

With the Experiential theory there is an implication of universality. Given the "same internal or external stimulus, there should be the same experience. There is a tendency or

innate disposition to perceive in a certain way. There are universal human structures in perception that result in certain inherent meanings" (Waters, 1983, p.46). There is also a tendency to experience a certain feeling in a particular situation. This may be because emotions have adaptive functions; for example, to feel fear or anxiety when standing near a cliff. These are just tendencies, not determining factors. Other factors such as "past experience, projection of future consequences, and other cognitive influences may override these tendencies. However, there would be a basic, common impulse or urge to behave evoked by the emotion even though it may be over-ridden by other factors" (Waters, 1983, p.47).

Patterns of imagery (Lyman, 1984) have both static and dynamic characteristics plus themes which can be identified through various forms of introspection and/or phenomenology.

1. Static Characteristic. The static characteristics include the sensation and image attributes of classic structuralism. These apply not only to the components but also to the pattern as a whole. They are: a) intensity, b) clarity, c) extensity, d) duration, and e) quality or kind; including image referent. The referents focus on what the image is getting at in concrete terms. For example, an adult walking through a park looking at the birds, includes references to a) people, b) nature, c) animal, d) activity. The concrete referents can also be subcategorized into further specific referents.

2. Dynamic Characteristics. Some of the major dynamic characteristics of the image patterns are: a) the order and sequence in which the components occur, b) the speed with which one follows another, c) the extent to which one component is pushed aside or displaced by another, and d) the quality of the movement.

3. Theme of the Imagery. Themes are not concrete properties of the experience but emerge from them and can be identified through phenomenological analysis.

The concrete characteristics of the experience may be unimportant for understanding the theme. For example, individual experiences of fear may have differences in concrete characteristics, but most people have a common understanding of the essential aspects of the experience. The particular thoughts, images or sensations may differ in each experiencer, but all have a common theme of feeling that one is fearful.

The Experiential theory of emotion does have some empirical support. Several contemporary theorists have recognized the relationship between imagery and emotion (Arnold, 1970; Izard, 1977; Schwartz *et al.*, 1974; Tomkins, 1962). But none, aside from Lyman (1984), has given imagery such a central role.

Pope and Singer (1978) state that, as a pattern of presentation of information can evoke certain emotions, thoughts and images can also generate specific emotional states. Starker, Pope and Singer (1978) note that the image mode is an essential and continuous synthesizing mode of data processing, which enables the expression and retention of meanings in terms of overall patterns of relations. Block (1981) also sees imagery as bearing semantic relations to things, as representing objects, relationships and states of affairs in an interpretative way, that picks out important characteristics to the imager.

Lyman, Bernardin and Thomas (1980) found greater frequency of imagery in emotion than in a nonemotion experience. The pattern of imagery referents was also significantly different. In the emotion experience, there was a greater frequency of images with reference to the past and future than images with references to the present; more frequent references to participating activities than to event or thing referents; and significantly more references to other people than to self references. More recently Lyman (1982), in comparing imagery in pleasant and unpleasant emotions, found a significantly greater number of incidental (situation irrelevant) image-initiated sequences in pleasant emotions, and those sequences contained

significantly more items. The number of single incidental images and the number of sequences initiated by situation-relevant images were significantly greater for unpleasant emotions. In a related study Lyman (1982) found that respondents, when reporting images and thoughts, stated that there was a significantly "greater number of single situation relevant thoughts in unpleasant emotions" (p.80). This suggests that thoughts may form an important part of the image patterns for emotions entailing action.

In a study done by Lyman and Waters (1983), respondents were shown 6 different series of four slides each, depicting various scenes, in forward or reverse order and with one- or five-second exposure and interval periods. In general, with the longer timing, the emotion experienced was more complex, often made up of significantly more emotions. In addition, the emotions tended to be "more subtle with the longer timing and more 'direct' with the short timing (e.g. sadness vs. anger)". Changes in order often produced significant differences in the kinds of emotions experienced with the effect being greater for the one-second timing.

Waters (1983), using segments of various styles of music, asked respondents to report both imagery and emotions. She found that patterns of both were significantly different for the different music stimuli and that the "emotion themes were related to characteristic themes of the reported imagery as well as to the themes of the music pieces" (Lyman, 1984, p.81).

Lundholm (1921), Hevner (1935), Wexner (1954) and others have shown that lines, forms, sounds, and colours have affective qualities and may carry with them some degree of emotion of abstract meaning (Lyman, 1979). In the same article Lyman found that certain basic structural form patterns, angular and rounded, have been definitely associated with certain emotions, as well as with abstract concepts such as consciousness. In many cases over "90% of the respondents agreed in designating an emotion or concept to a form" (Lyman, 1979, p.841).

Lyman and Waters (1986) asked respondents to describe the sensations and to identify the loci of those sensations for 34 emotions. The methods of reporting were introspection, retrospection and recollection. There was no evidence that any method was consistently better than the others. Results revealed that within each emotion, the kinds and frequency of loci cited differed significantly. The most frequently mentioned sensory loci were the stomach, face, head, heart, hand-heart, and face. Although not "distinctive for all emotions, there were characteristic patterns of sensory loci and sensory qualities as shown by high frequencies of citation" (p.25). These researchers suggest that these sensory loci and qualities are one of several components of experienced emotion. The results are seen as supporting "subjective" or phenomenological studies of emotion.

Thus, as a pattern of sensation can be associated with an emotion, the Experiential theory of emotion hypothesizes that patterns of subjective "sensations", that is, images, can also be associated with an emotion.

Previous research would seem to indicate that imagery, thoughts, and ideas arise from experienced emotions. But there are few theories that can account for this fact. Only the Gestalt and Experiential theories seem to be able to account for this range of experiences which an individual senses when emotions take place. The purpose of this research is to examine what sorts of imagery arise from various experienced emotions for two distinct groups.

C. PRESENT STUDY

I. Research Hypothesis

The purpose of this study was to compare the imagery arising from 24 mentally experienced emotions between an able-bodied group and a recent, permanently disabled spinal cord injured group. These comparisons would be used to strengthen the arguments against three theories which are still held by certain researchers and medical health practitioners.

Hypothesis

There would be significant differences in the levels of imagery arising from 24 emotions between the experimental (spinal cord injured) group and the control (able-bodied) group. The particular patterns of differences would support the following hypotheses concerning the results of a permanent spinal cord injury:

1. the stage theory of adjustment involving heightened levels of anxiety, aggression or hostility, depression, fear, and grief or distress;
2. the depression-denial hypothesis; and
3. the hypothesis that the disruption in the autonomic nervous system and its afferent return causes notable changes in experienced emotional feelings.

II. Method

1. Subjects

The subjects for this study were selected from 2 different populations. Each sample consisted of 20 male Caucasian subjects ranging in age from 17 to 35. The first sample (the control group), with a mean age of 23.4, was selected from the population of students at Simon Fraser University in Vancouver attending undergraduate courses (see Table 5). The second sample (the experimental group), with a mean age of 24.9, was selected from the population of inpatients at G.F. Strong Rehabilitation Centre in Vancouver, who were receiving therapy for permanently disabling spinal cord injuries which they had received within the past six months (see Table 6). Table 7 reveals that of the 20 participants in the study, 13 were quadriplegics and 7 were paraplegics. As with the results from the United States and British Columbia as a whole, the majority (70%) of these participants received their permanent disability by a motor vehicle accident.

2. Measures

A questionnaire was used to collect the phenomenological introspective reports of the imagery arising from each of the emotional experiences. This method lies somewhat between a phenomenological report which consists of unanalytical descriptions of all thoughts, images, feelings, etc. that are present in consciousness and classic introspection which seeks the most detailed analysis of experience into irreducible elements. Phenomenological introspection attempts to focus on some component of the total experience while ignoring all others. The Questionnaire, which is listed on Tables 8, 9, and 10, included:

1. A release form, with spaces for age and name. This form contained the statement that: "The purpose of the project is to identify the image and thought characteristics of a

variety of emotions. You will be asked to imagine yourself experiencing a number of different emotions and to complete a questionnaire describing the thoughts and/or images occurring during each emotion. This cover sheet will be removed and your name plus responses will be kept completely confidential. If you have no objections, please proceed."

2. Instructions, which were as follows:

"Imagine yourself experiencing (one of twenty-four emotions).

TAKE TIME TO IMAGINE IT CLEARLY.

Now you will see that a lot of images come to mind. Images are 'pictures in the head' or scenes or objects that you visualize. Also, a lot of thoughts and ideas will probably come to mind. Please think about what you are experiencing and indicate how many of the following are in the images, thoughts or ideas when you experience (one of twenty-four emotions)."

3. Emotion Checklist

The Emotion Checklist was compiled from three sources:

a) Davitz's Dictionary of Emotional Meaning (Davitz, 1969), which consists of 50 emotions.

b) Izard's (1977) list of 9 fundamental emotions.

c) Some additional emotions that appeared to be relevant for the groups being tested. The result was a total of 24 emotions, which are listed on Table 8.

4. Thoughts, Imagery and Ideas Checklist

This checklist was compiled from two sources:

a) Waters (1983) Master's Thesis which consisted of three categories of imagery, broken down into 15 subcategories.

b) Lyman and Waters (1986) research on imagery arising from experienced emotion. The result was a total of 31 thought, image, and idea categories, which are disclosed on Table 9. In the appendix titled Imagery and Thought Coding, these 31 categories are described in great detail to explain how they were originally developed. Each of the 31 possible thought and imagery categories was rated on a scale from none to very many. There were 24 rating sheets, one for each of the emotions.

5. Examples of Thoughts, Images and Ideas

For each of the 31 possible thought and imagery categories an example was given so that each category's meaning would be unambiguous to the subjects. The examples are listed in Table 10.

3. Procedure

Both the control (able-bodied) and experimental (disabled) groups were asked to fill out a questionnaire for each of the 24 emotions, randomized in order for each subject. All subjects were informed that their participation was completely voluntary, that if at any time they wished to withdraw from participation they could, and that all information received was completely confidential. Each subject was asked to imagine one of the 24 emotions at a time and record the thoughts, imagery, and ideas either while it was happening or immediately afterwards. Each subject was given a recording sheet for each of the 24 emotions.

This researcher stayed with each of the disabled subjects throughout the procedure if the subject physically needed assistance filling out the rating forms. Otherwise this researcher stayed with each subject until they understood the nature of the questionnaire and the testing procedure completely. This researcher, at periodic intervals, checked with each of the subjects to see if any problems and/or questions had arisen. Subjects were not required to complete the rating sheets for each of the 24 emotions at one time, but were allowed to work at their leisure. The subjects that needed physical assistance completed the questionnaire at times suitable to their personal schedule. The whole procedure for all subjects took approximately three hours.

D. RESULTS & DISCUSSION

I. Results

Once the imagery was coded for each of the 24 emotions, for both the able-bodied and disabled groups, the data were statistically analyzed for the ANOVA F's, using a one between two within repeated measures design. A repeated measures design was used given that there is a dependence between the emotions caused by the repeated testing of the same subjects in each group.

The data were first analyzed to examine whether there were any interactions taking place. Both the groups x emotions x imagery interaction and the emotions x imagery interaction were significant, as can be seen from Table 1. However, due to the lack of Huynh-Feldt correction, which takes into account the bias when there is a violation of the homogeneity of variances assumption of different scores which leads to an adjustment in the degrees of freedom, and since the data were analyzed using BMD P8V, which does not employ this correction, little more can be said about the analytical outcomes.

Table 1. Repeated Measures ANOVA of Groups x Emotions x Imagery

Source	DF	Mean Square	F	Prob.
1. Mean	1	248822.1339	608.33	0.0000
2. Group	1	1225.0485	3.00	0.0916
3. Emotion	23	128.4288	5.75	0.0
4. Imagery	30	485.9319	31.40	0.0
5. Subjects (Group)	38	409.0220	-	-
6. Groups x Emotions	23	38.1351	1.71	0.0205
7. Groups x Imagery	30	17.2343	1.11	0.3082
8. Emotions x Imagery	690	7.8132	2.69	0.00
9. Subjects x Emotions (Groups)	874	22.3306	-	-
10. Subjects x Imagery (Groups)	1140	15.4846	-	-
11. Groups x Emotions x Imagery	690	3.8843	1.34	0.0000
12. Subjects x Emotions x Imagery (Groups)	26220	2.9090	-	-

The emotions x imagery interaction was statistically analyzed using BMD P2V to see if overall emotion groups interacted with any of the 31 imagery classes. As mentioned previously, since one of the assumptions in a Repeated Measures Design involves homogeneity of the variance of the different scores plus the fact that one has to acknowledge the covariances due to the repeated testing of the same subjects, Huynh-Feldt probability values were reported. Given this alteration, the significance level was set at .05/31 = 0.0016. None of the imagery classes interacted at a significant level with overall emotion groups.

Given that there is an emotions x imagery interaction taking place, but is not disclosed when analyzed using BMD P2V, an alteration was made in the inquiry. It was decided to collapse 31 imagery categories into 18 distinct classes so that the significance levels would not be so restrictive. This was done by combining all of the subcategories that were under one of a number of primary categories. As an example, the primary category, Objects, had two subcategories, Manmade and Nature. These were combined into one category, Objects - Manmade & Nature.

The results revealed that only one of the imagery classes, Inner Focus of Attention, interacted at a significant level with overall emotion groups as can be seen from Table 2 when Huynh-Feldt probability values were reported. This set the significance level at .05/18 = 0.0027.

Since using Huynh-Feldt probability values decreases the level of power for any analysis, it was decided to do a cursory examination to see which imagery classes interact with overall emotion groups at a .05 significance level.

With this alteration, the imagery classes Number of Thoughts & Images; Places - Manmade & Nature; Time - Past, Present & Future; Consequences Implied; Situation Initiated

by Self; Situation Initiated by Others; and Inner Focus of Attention, all interact significantly with overall emotion groups. No further detailed analysis was carried our on these particular interactions.

Table 2. Repeated Measures ANOVA of Emotions Groups to Imagery Classes

Imagery Classes		DF	Mean Square	F	Huynh-Feldt Prob.
A.	Number of Thoughts & Images	23	10.13043	2.05	0.0068
B.	Descriptive & Colour Detail	23	5.57117	1.26	0.2088
C.	Figures - Self, Others, Body Parts & Animals	23	6.61349	1.31	0.1815
D.	Objects - Manmade & Nature	23	3.81030	0.87	0.6044
E.	Places - Manmade & Nature	23	8.04400	2.05	0.0079
F.	Active Activity - Self & Others	23	8.47769	1.56	0.0589
G.	Activity - Manmade & Nature	23	3.11350	0.77	0.7210
H.	Passive Activity - Self & Others	23	3.38259	0.66	0.8320
I.	Action Implied	23	4.47495	1.28	0.2024
J.	Events - Manmade & Nature	23	3.91501	1.02	0.4322
K.	Time - Past, Present, & Future	23	10.27095	1.86	0.0246
L.	Consequences Implied	23	7.03582	1.80	0.0191
M.	Realistic Imagery	23	5.19928	1.56	0.0636
N.	Fantasy Imagery	23	3.06155	0.75	0.7550
O.	Situation Initiated by Self	23	7.13895	1.69	0.0382
P.	Situation Initiated by Others	23	7.03243	1.78	0.0218
Q.	Inner Focus of Attention	23	9.25851	2.43	0.0005
R.	Outer Focus of Attention	23	4.58148	1.26	0.1970

Each of the 24 emotions was examined to see if there were any significant differences between the able-bodied and the disabled groups, involving the imagery class, Inner Focus of Attention. This was analyzed by using a Two Sample T Test for two independent groups. The results which are given in Table 3 revealed that there were significant differences between the two groups for five of the emotions: anxiety, worry; boredom; friendliness, outgoing; sadness; and shame, ashamed, which involved the imagery class Inner Focus of Attention when the significance level was set at .05.

Table 3. Two Sample T Tests of Twenty-Four Emotions to Imagery Class, Inner Focus of Attention

Emotions		DF	T (Pooled)	P - Value
A.	Affection, Love	38	1.42	0.1648
B.	Anger, Hostility	38	0.20	0.8457
C.	Anxiety, Worry	38	2.13	0.0396
D.	Boredom	38	2.40	0.0215
E.	Contempt, Hatred	38	-1.13	0.2663
F.	Contentment, Content	38	0.72	0.4734
G.	Dependence, Helplessness	38	-1.11	0.2724
H.	Depression, Gloomy	38	1.51	0.1400
I.	Disgust	38	-0.75	0.4606
J.	Distress	38	0.76	0.4521
K.	Emptiness, Longing, Yearning	38	0.90	0.3742
L.	Fear, Afraid	38	0.75	0.4581
M.	Friendliness, Outgoing	38	-2.03	0.0491
N.	Frustration	38	-0.40	0.6893
O.	Guilt	38	0.89	0.3764
P.	Incompetence	38	2.01	0.0517
Q.	Interest	38	-1.85	0.0720
R.	Intruding, In the way	38	-0.40	0.6921
S.	Joy, Elation	38	0.39	0.6965
T.	Loneliness	38	1.03	0.3094
U.	Sadness	38	3.12	0.0034
V.	Self-confidence, Assured	38	0.07	0.9455
W.	Shame, Ashamed	38	2.96	0.0052
X.	Surprise	38	-2.02	0.0510

Further analyses were carried out by plotting the means and standard deviations for the 24 emotions, which involved the imagery class, Inner Focus of Attention, on graph paper for both groups (See Figure 2). In very general terms, the graphs reveal that the able-bodied group shows much more fluctuation in the means as compared to the disabled group. In opposition to this, the disabled group revealed a greater level of variance above and below the means reflected in the standard deviations for all of the emotions except one: frustration. Above the means there was an overlap between the two groups for the emotions affection and guilt. Below the means there was an overlap between the two groups for the emotions

contempt, disgust, and intruding. Stated another way, the majority of the emotions (19 out of the 24) displayed no overlap when comparing the plots for the two groups.

The means for the 24 emotions, which involved the imagery class, Inner Focus of Attention, were also ranked in descending order for both the disabled and able-bodied groups (see Figure 3). In similar fashion as Figure 2, the rankings reveal that the able-bodied group displays a much greater spread between the largest and smallest means for the emotions as compared to the disabled group. The disabled group displays a bell curve in the dispersion of the means for its emotions. The disabled group has roughly double the number of emotion means in the middle range as compared to the able-bodied group.

As a final step, both means and standard deviations for each of the 24 emotions at all levels of the 31 imagery categories for both the able-bodied and disabled groups were charted (see Figures 4 and 5).

II. Discussion

The first hypothesis tested was whether there was support for the theory that there are stages involved in the adjustment to a permanent spinal cord injury. This research does not support the stage theory of adjustment. Various researchers have given different names to the stages of adjustment. Of these, a number used the names of common emotions. They were: anxiety, aggression or hostility, depression, fear, and grief or distress; all of which were tested by this research. Only one of these emotions—anxiety, worry—was found to have significantly different levels of imagery references when the disabled group was compared to the able-bodied group. This result provides somewhat ambiguous support for the stage theory of adjustment. The explanation for this is that since only one of the emotions was found to be significantly different between the two groups yet the other emotions involved in the stage theory did not differ between the two groups, the obvious answer arises, the research revealed this result due to the fact that the disabled group was at the anxiety, worry stage but not at any other emotion labelled stages.

The problem with this explanation is that only three out of the eleven researchers previously mentioned talk about an anxiety, worry stage and of these three, all have this phase occurring in a differing order of sequence from one to another when they discuss the stages of adjustment to a spinal cord injury. Also, one would assume stage theorists who do not use the anxiety, worry phase would have one or more of their emotion labelled phases to be significantly different when the two groups were compared. This was not found.

Given that each researcher has his or her own particular sequencing of stages, plus the number of stages a disabled individual must proceed through, it is extremely difficult to state

categorically that even partial support has been provided for the stage theory of adjustment to a permanent spinal cord injury.

A number of interpretations can be given for this result. Obviously the first is that there really are no stages of adjustment to a permanent spinal cord injury, in that the stage theory originally arose out of research that was based merely on clinical impressions rather than on solid theoretical research. Once the idea of the stage theory of adjustment arose out of research done in the 1950s, it seemed to take on a life of its own. Only recently has there been serious doubt raised about the validity of the stage theory of adjustment to a permanent spinal cord injury.

The second interpretation is that the emotionally labelled stages of adjustment are not significantly found due to the fact that there are no unitary spinal cord injury personality types. Given this fact, why should an eclectic group of individuals who suffer a permanent spinal cord injury go through a number of stages in their adjustment? This interpretation fits nicely with Dunn's (1970) explanation that patients' reaction to a permanent spinal cord injury did not reveal a unitary pattern but was highly variable from patient to patient. Stage models "make little or no allowance for individual differences in personality, coping styles, or life experiences" (p.912B).

Further, on an individual basis, a permanent spinal cord injury may be viewed as nothing more than another one of life's challenges, though granted a very large one. Given this challenge, why would an individual abandon his or her particular means of handling a traumatic situation for a probable, unknown emotional stage theory of adjustment? More extensive explanations will be given for the failure to find explicit evidence for the stage theory of adjustment to a permanent spinal cord injury, by this research, when the interpretations of the results from the second hypothesis are reviewed.

The second hypothesis tested, which is related to the first, is whether there is a pattern of depression after a permanent spinal cord injury and if not, does this imply a denial of disability. This research does not support either part of this hypothesis. If there were in fact a pattern of depression after a permanent spinal cord injury, there should have been a marked deviation in imagery references for the disabled group as compared to the able-bodied group, since the disabled group were all tested at approximately the same time in their rehabilitation process. The emotion, depression, had no significantly deviated levels of imagery references when the two groups were compared.

It is important to note that both negative and positive emotions were used when examining the imagery that arose from experienced emotions. Positive emotions are especially important to include in this study because they allow for an examination of possible scaling judgment effects related to the trauma of a spinal cord injury (Parducci, 1968). If a person has experienced a terrible event, it may change the lower anchor point against which they judge other negative events. According to this reasoning, spinal cord injured individuals would later feel less emotional about negative events because they would judge these events to be less significant than they did before their injury. Compared with a spinal cord injury, most everyday hassles would seem trivial. Given this reasoning, if spinal cord injured persons react to negative events less after their injury because of a lower negative anchor, it is likely that they would experience positive events even more positively because of the same contrast effect. Thus, the assessment of positive emotions is critical in ruling out the judgment explanation.

The disabled group does not reveal any symptoms of denial of their permanent spinal cord injury. Evidence shows that only 5 of the 24 emotions reveal differing imagery references, at significant levels, when the disabled group was compared to the able-bodied

group. One would assume that if the disabled group were denying their permanent spinal cord injury, there would be significant differences in the levels of imagery references between the two groups. This is especially so for the negative emotions; that is, when analyzing the 17 negative emotions that were tested, the disabled group should have revealed at least a few that had significantly lower levels of imagery references as compared to the able-bodied group. The explanation for this theory is that if an individual is to deny his or her permanent spinal cord injury, one would assume that there would be a suppression of some, if not all, negative emotions. In fact, of the five emotions which differed between the two groups, four of these were negative emotions (anxiety, worry; boredom; sadness; shame, ashamed), and they revealed increased levels of imagery references for the disabled group as compared to the able-bodied group.

For the seven positive emotions, the disabled group should have revealed some emotions that had significantly higher levels of imagery references as compared to the able-bodied group. The explanation, which is similar to the previously mentioned one, is that with the denial of a permanent spinal cord injury there should be an elevation of some, if not all, positive emotions. Only 1 of the 7 positive emotions (friendliness, outgoing) revealed any significant differences in the levels of imagery references when comparing the two groups, and for this emotion there was a decrease in the level of imagery references for the disabled group as compared to the able-bodied group. These results rule out the judgment explanation. There does not seem to be a lowering of the anchor point by the spinal cord injured group when judging emotion arousing imagery.

Another plausible explanation for these results, which are in opposition to a number of studies that found a significant level of depression following a spinal cord injury, is that these conclusions were derived without the impressionistic assumption that a period of

depression must follow a spinal cord injury. Given that the subjects themselves gave the recorded data without reinterpretation by the researcher, a much more objective level of data was recorded. In this manner the "clinical, subjective" assumption about the reaction of depression to a spinal cord injury was avoided.

Other interpretations can also be given for these results. As previously mentioned when explaining the outcome from the first hypothesis, researchers have discovered that there is no unitary spinal cord injury personality type. Given this fact, it is not surprising that a widely varying group of individuals who suffer a permanent spinal cord injury do not all exhibit increased signs of depression and if not, varying degrees of denial of their disability.

Another interpretation of these results is that individuals who suffer a permanent spinal cord injury are very realistic about their disability and consciously decide that staying in a prolonged depressive state will not help them carry on with many other aspects of their lives, such as rehabilitation and family relationships.

In the same manner, to reject the strategy of the denial of a permanent spinal cord injury and accept the realistic situation an individual is now faced with seems to be a far superior strategy. As previously mentioned, the individuals who take this strategy will deal with their disability constructively and also carry on with other meaningful aspects of their lives.

The results of the previously mentioned studies by Dinardo (1971) and Malec and Niameyer (1983), which found that patients who were most depressed tended to have greater difficulty in adjusting to their disability, required longer periods of rehabilitation, and had lower levels of desirable self-care, seem to corroborate these conclusions. Other studies which found that patients with internal attributions of control report lower levels of distress and

depression and demonstrate more adaptive behaviours during rehabilitation also enhances these conclusions (Rosenbaum & Raz, 1977; Shadish, Hickman & Arrick, 1981).

The strategy of avoiding prolonged depressive states and rejecting the strategic use of denial by the spinal cord injured patients is also beneficial in that people who constantly talk about their unhappiness tend to be avoided. Zola (1982) says that one of the greatest problems of being disabled is that one is not allowed to express negative feelings and that little allowance is made for situational distress caused by a bad day. Wright (1983) argues that the sick and disabled are confronted with a paradox because they also encounter a social requirement of mourning:

> On the one hand, lacking physical normality, the person is expected to suffer. That is the requirement of mourning. On the other hand society frowns upon displaying one's hurt and frustration in public. One should keep a "stiff upper lip" and "keep on smiling"—a "requirement of cheerfulness" as it were
>
> (p.84)

Health professionals have also been shown to avoid the depressed. Cartwright (1979) argues that the ideology of the detached "professional self", which has been taught in health education programs, fails to equip the health professional with coping skills to deal with the feelings that distressed patients arouse. Such problems have been documented among nurses working with quadriplegics (Sadlick & Pena, 1975).

Given these results from the various studies mentioned it is not surprising that persons with spinal cord injury would tend to avoid marked periods of depression and also be as realistic as possible about their current situation. This is not to say that spinal cord injured patients do not experience periodic states of emotion, especially negative ones, as revealed in this research.

The third hypothesis tested is whether a permanent spinal cord injury, which leads to the disruption in the autonomic nervous system and its afferent return, causes notable changes in experienced emotional feelings. This research does not support this theory. If a permanent spinal cord injury had caused a reduction in experienced emotional feelings, the disabled group should have exhibited a marked reduction in the level of imagery references as compared to the able-bodied group. Only 1 of the 24 emotions (friendliness, outgoing) tested revealed a reduction in the level of imagery references for the disabled group. This is contrasted by the results which revealed that 4 of the 24 emotions had an increase in the level of imagery references for the disabled group and 19 of the 24 emotions revealed no differences in the levels of imagery references between the two groups.

This research supports the centralist theory of emotion which assigns bodily feedback a minor role, maintaining that experienced emotion is exclusively a cortical process. This research argues against the peripheralist theory of emotion, which places great importance on the proprioceptive and visceral feedback from the body for the subjective experience of emotion.

Several interpretations for these results can be given. The first is that in opposition to Hohmann's data that supported the peripheralist theory and was collected in the 1950s using disabled individuals whose future in terms of the number of years they would survive beyond their injury and their chances of living outside an institution were extremely bleak; this research was done with disabled subjects who possess a much more positive attitude about themselves and their future prospects. In this manner, opposing results are not surprising. Instead of Hohmann's explanation that a reduction in emotional feeling was caused by a disruption in the nervous system, a more plausible answer for his results would be the discouraging patient outlook given to his subjects.

Another interpretation of Hohmann's findings, using results from a study done by Siener, Sandvik & Larsen (1985), which found that all people's emotional intensity appears to decrease with age, is that spinal cord injured people might have reported less intense emotions because of normal age trends, not because of an absence of autonomic feedback. Hohmann did find the greatest decrease in emotional intensity among those with the highest cervical lesions, who thus had the least perception of their bodily responses. This finding, however, might have occurred if those subjects had more limited, less emotional lives. That is, cervical lesion subjects may not report less emotion because they have the least autonomic feedback, but rather because they are more limited in terms of the activities they can enter and the events they can experience.

Hohmann's methodology must also be questioned in that the reported decrease in intensity of emotions was based on the subjects' retrospective comparison of their emotional life at the time of the interview with their experiences prior to their injury. When one examines the length of time since injury for Hohmann's subjects, this possible confound becomes very significant. Out of 25 subjects, 15 of them were recollecting back to a time more than 10 years since their injury. This raises the question of whether the findings were due to memory biases rather than to actual declines in emotional intensity. Another methodological problem with Hohmann's research was the lack of a control group with which to compare the declines in emotional intensity reported by the spinal cord injured subjects. The final methodological problem which may have influenced Hohmann's results is his use of only negative emotions. This leads to the speculation of possible judgment effects. That is, if spinal cord injured persons react to negative events less after their injury because of a lower negative anchor, it is likely that they would experience positive events even more positively because of the same

contrast effect. Given that Hohmann did not use any positive emotions, this effect could not be analyzed.

Concerning Jasnos and Hakmillan's (1975) research supporting the peripheralist theory, it could be speculated that having disabled subjects mentally imagining themselves experiencing the arousal stimulus (i.e. slides of nude women) and then asking them to describe their feelings is a confounding variable. It may be that subjects with high (cervical) lesions described less intense feelings of arousal than the subjects with lower (thoracic and lumbar) due to the fact that they have less physical ability to act on this situation in real life, and therefore tend to reduce their reported arousal from very personal subjective topics. Given that the present research was conducted by having subjects experience the emotions by the phenomenological method, that they did not report the experienced emotion but only the imagery involved, and were free to choose any incident that represented a particular emotion, the possible confounding variable in Jasnos and Hakmillan's research was avoided.

In support for the above mentioned speculation is a study done by Linton (1973) that is very similar to Jasnos and Hakmillan's in research strategy but slightly different in the method used to report the emotional arousal. Instead of the disabled subjects mentally imagining themselves experiencing the arousal stimulus and then reporting their feelings, Linton simply had both disabled and able-bodied subjects view and judge slides of sexual content. In this manner the disabled subjects were not mentally imagining themselves experiencing the sexual content but merely judged the sexual matter on a much more objective level. The results of Linton's research were that the two groups did not differ in their overall level of slide ratings of the sexual content.

The research by Chawlisz *et al.* (1988), which found that spinal cord injured persons with the most limited bodily feelings often reported feeling several emotions more intensely

than before their injury, leads to the speculation that, aside from the obvious differences in future outlook these subjects have as compared to Hohmann's subjects, it must be noted that Chawlisz's *et al.* subjects were spinal cord injured persons who were enrolled in university courses and would, in some sense, be experiencing many more events than a group of disabled subjects confined to an institution.

Research by Hahnstadt (1986) plus Lowe and Carroll (1985) also support the hypothesis that a permanent spinal cord injury does not cause notable changes in experienced emotional feelings.

Both sets of research used methods to investigate the emotional experience of spinal cord injured individuals that were similar to this study, that is, imagery. Both Hohnstadt's plus Lowe and Carroll's research differed from this study in two ways. The first is that this study used 24 emotions whereas Hahnstadt used 4 emotions and Lowe & Carroll used 8 emotions.

Secondly, this study focused on a large number of image referents arising from imagining an emotion experience whereas Hahnstadt asked subjects to report their affect arousal for each of the emotions and Lowe & Carroll had subjects compare their intensity of feeling for each emotion since becoming disabled to a similar emotion prior to their injury.

Still, when both sets of research are examined together with this Master's Thesis, a strong case can be made for the hypothesis that a permanent spinal cord injury does not cause notable changes in experienced emotional feelings.

The cursory analysis which resulted in the finding that a number of imagery classes such as Number of Thoughts & Images; Places - Manmade & Nature; Time - Past, Present & Future; Consequences Implied; Situation Initiated by Self; Situation Initiated by Others; and Inner Focus of Attention all interacted at the significance level of .05 with overall emotion

groups was examined. It was speculated that one of the reasons why these imagery classes interacted with overall emotion groups was because they tended to categorize the imagery arising from experienced emotions in such a way that it focused the imagery towards the spinal cord injured immediate situation. As an example, the imagery category Time - Past, Present & Future tends to direct the imagery arising from experienced emotions for the disabled group towards their immediate physical dilemma as opposed to the able-bodied group, who have no comparative physical problem.

One may question why a category such as Figures - Self, Others, Body Parts & Animals did not interact at a significant level with overall emotion groups. Obviously, the subcategory Figures - Body Parts is very relevant to the spinal cord injured group. One problem may be that by combining these four subcategories into one category, which increased the significance level, caused a corresponding loss of information. Unfortunately, such decisions had to be made when doing this type of exploratory research.

The differences between the disabled and able-bodied groups for the one imagery class, Inner Focus of Attention, were also interpreted, in very general terms, by examining the simple effects through plotting the means and standard deviations plus ranking the means. As stated in the Results section, both the plotted graphs and the rankings reveal that the able-bodied group shows much more fluctuation in the means as compared to the disabled group. This discloses that for each of the emotions the individuals in the able-bodied group all seem to rate them in a similar manner. All seem to rate one emotion high, therefore raising the mean for that emotion and for another emotion rate it low, therefore lowering the mean for that emotion. This is displayed nicely when examining the ranked means. The able-bodied ranked means for the 24 emotions are much more spread out as compared to the disabled ranked means for the 24 emotions. In fact the disabled group's ranked means tend to display

a bell curve with a great many emotions bunched in the middle. This seems to disclose that the individuals in the able-bodied group are slightly more homogeneous, as compared to the disabled group, in their mean ratings of the imagery arising from each emotion.

In contrast to this, the disabled group displays a greater level of variance above and below the means which is reflected in the standard deviations for all of the emotions except one: frustration. This appears to reveal that the disabled group has a more extreme dispersion for each emotion, except frustration, than the able-bodied group. This seems to reveal that the individuals in the disabled group are slightly more heterogeneous than the able-bodied group in terms of standard deviation, when they rated the imagery arising from each emotion.

Two explanations can be given for these results. The first is that a group of subjects made up of university students is indeed a select part of society and, therefore, tend to experience imagined emotions in the same relative manner. The second is that individuals who suffer a permanent spinal cord injury are not made up of people who can be classified as fitting a particular category (i.e. risk takers) and therefore, tend to experience imagined emotions in a slightly varied manner from subject to subject. These differences between the two groups for the one imagery class, inner focus of attention, are very minimal, though, so the above mentioned explanations must be considered to be speculative at this time.

Obvious improvements in the research strategy taken by this research are, firstly, an increase in subjects for both groups. Given the number of variables involved when 24 emotions are multiplied by 31 imagery referents (=744), one soon realizes what a benefit an increase in subjects would have. This researcher was compromised by the fact that it took 11 months just to receive compliance from 20 permanently disabled spinal cord patients to

complete the survey. Also due to the limited time span given to complete a Master's Thesis, modifications were made to limit both the disabled and able-bodied groups to twenty subjects.

Secondly, after the data were analyzed it was realized that by limiting the number of imagery references to ones that are deemed extremely important, the significance levels could have been greatly improved. This could also possibly increase the level of compliance from both groups of subjects in that the questionnaire would no longer take so much time to complete. Along these lines, this researcher also believes it would be beneficial to increase the scales that were used to measure each of the 31 imagery referents from 1 through 7 to 1 through 15. In this manner the high end of the scale, "very many", which was scaled 7, would now retain a much higher number, therefore giving subjects a greater selection at the top end of the scale and thereby limiting the automatic circling of very many for a large number of image references per class.

There are limitations to this study. There are potential problems with self-report measures of imagery arising from an imagined emotional situation. Demand characteristics such as social desirability might have affected what was reported, but given that the actual imagined emotional incidents were not explicitly expressed and that the majority of subjects in both groups filled out the questionnaire themselves, it is hoped the social desirability confound was avoided.

Self-reports through the use of questionnaires, as was done in this study, have the additional problems of self-selection and the degree of cooperation in complying with the researcher's requests. It is never completely known if the sample that chooses to participate in a questionnaire differs from the sample that does not participate. Given that this researcher asked all subjects that fit the preselected profile to participate and tried to be as unbiased as possible when approaching potential subjects it is hoped that these problems, plus others that

were mentioned when experienced rehabilitation staff rated patients' psychological states, did not play a significant role in the collection of data for this Master's thesis.

By the use of self-report questionnaires this researcher, as well as others, must realize that they are capturing subjects at one specific moment in time in which they are asked to, in some sense, estimate their subjective ideas and thoughts. These estimations are ratings which depend largely on the accuracy and cooperation of the subject. As with this thesis and other self-report questionnaires, a great deal of knowledge would be gained by doing a multi-stage self-report questionnaire over a lengthy period. This would eliminate the problems of capturing subjects at one specific time in their lives (i.e. rehabilitation process), to eliminate factors such as time since injury, age of subjects and setting of testing.

Finally, researchers must always be cautious in the use of relatively new theories (i.e. Experiential theory of emotion) on which they base their assumptions, especially when the theory is still in the testing stages. The obvious problems are that there may be inadequate measurement of the constructs under examination and the levels of reliability plus validity may not be fully known.

Table 1

Incidence of Paraplegia and Quadriplegia by Cause of Injury (United States)

Cause of Injury	Level of Spinal Injury		
N=2,821	Paraplegia	Quadriplegia	Both
Vehicular accident	47.5%	46.5%	47.0%
Penetrating wounds	20.9%	6.3%	13.3%
Sports	2.3%	26.4%	14.8%
Falls	24.9%	17.3%	21.0%
Others	4.4%	3.5%	3.9%
Total	100.0%	100.0%	100.0%

Note:

National Spinal Cord Injury Model Systems Conference: Proceedings (1978). From Spinal Cord Injuries: Psychological, Social, and Vocational Adjustment (p.17) by R.B. Trieschmann, 1980, Toronto: Pergamon Press.

Table 2

Cause of Spinal Injury According to Sex (United States)

Cause of Injury	Sex of the Spinal Injured Person		
N=2,854	Male	Female	Both
Vehicular accident	44.6%	57.4%	46.9%
Penetrating wounds	13.0%	14.4%	13.2%
Sports	16.3%	8.4%	14.9%
Falls	22.4%	14.6%	21.0%
Others	3.7%	5.3%	4.0%
Total	100.0%	100.0%	100.0%

Note:

National Spinal Cord Injury Model Systems Conference: Proceedings (1978). From Spinal Cord Injuries: Psychological, Social, and Vocational Adjustment (p.17) by R.B. Trieschmann, 1980, Toronto: Pergamon Press.

Table 3

Cause of Spinal Injury According to Sex (British Columbia)

Cause of Injury N = 160*	Sex of Spinal Injured Person Male	Female	Both
Number in %	73%	27%	-
Vehicular Accidents	58%	58%	58%
Sports	13%	9%	11%
Falls	23%	9%	16%
Industrial accidents	5%	-	2.5%
Others	1%	24%	11.5%
Total	100%	100%	

Source:

Canadian Paraplegic Association, 1989, Vancouver, British Columbia

* April 1988 - March 1989

Table 4

Total Males Spinal Cord Injury

British Columbia	118*	
Between ages of 17-35	67**	
Quadriplegic	29	43%
Paraplegic	38	57%
Vehicular accidents	42	63%
Sports	11	16%
Falls	10	15%
Industrial accidents	2	3%
Others	2	3%
Total	67	100%

* April 1988-March 1989
** Considered for study

Table 5

Able-Bodied Participants

		Age
1.	P.B.	27
2.	D.D.	21
3.	S.T.	31
4.	H.H.	27
5.	B.K.	23
6.	K.S.	19
7.	K.D.	22
8.	S.H.	23
9.	W.S.	20
10.	B.K.	31
11.	G.P.	23
12.	S.H.	23
13.	G.H.	21
14.	D.K.	21
15.	A.M.	23
16.	R.N.	24
17.	C.L.	22
18.	A.A.	22
19.	C.B.	22
20.	C.P.	22

$\bar{X}$ Age $\frac{467}{20} \approx 23.4$

Range = 19 - 31

S.D. = 3.25

Table 6

Disabled Participants

		Age	Level of Injury
1.	G.S.	19	T3
2.	S.B.	33	T4
3.	G.S.	34	L3
4.	B.P.	17	C5
5.	R.L.	28	T10
6.	E.M.	29	T7
7.	R.F.	28	T8
8.	L.P.	30	C6
9.	C.S.	19	T4
10.	J.R.	19	T6
11.	A.V.	24	C5
12.	D.S.	22	L1
13.	H.V.	35	T12
14.	B.G.	19	C6
15.	M.L.	35	C5
16.	R.P.	19	C7
17.	S.L.	28	T2
18.	A.P.	19	T11/12
19.	C.S.	19	C5
20.	R.M.	22	T12

$\bar{X}$ Age $\frac{498}{20} \approx 24.9$

Range = 17 - 35

S.D. = 6.27

Table 7

Males Spinal Cord Injury

Participants in study	20*	
Quadriplegic	13	65%
Paraplegic	7	35%
Vehicular accidents	14	70%
Sports	-	-
Falls	2	10%
Industrial accidents	3	15%
Others	1	5%
Total	20	100%

* April 1988-March 1989

Table 8

Emotions

1. affection, love
2. anger, hostility
3. anxiety, worry
4. boredom
5. contempt, hatred
6. contentment, content
7. dependence, helplessness
8. depression, gloomy
9. disgust
10. distress
11. emptiness, longing, yearning
12. fear, afraid
13. friendliness, outgoing
14. frustration
15. guilt
16. incompetence
17. interest
18. intruding, in the way
19. joy, elation
20. loneliness
21. sadness
22. self-confidence, assured
23. shame, ashamed
24. surprise

Table 9

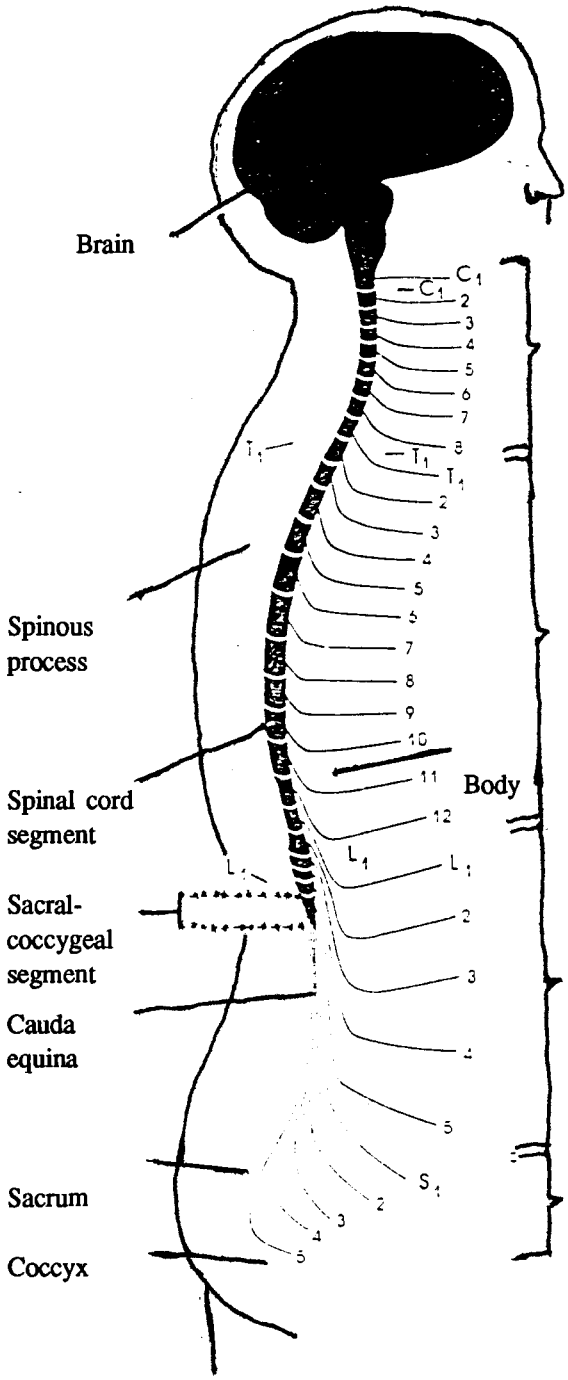
Checklist for Images, Thoughts & Ideas

1.	Number of thoughts	none 1 2 3 4 5 6 very many
2.	Number of images	none 1 2 3 4 5 6 very many
3.	Descriptive detail	none 1 2 3 4 5 6 very many
4.	Colour detail	none 1 2 3 4 5 6 very many
5.	Figures, self	none 1 2 3 4 5 6 very many
6.	Figures, others	none 1 2 3 4 5 6 very many
7.	Figures, body parts	none 1 2 3 4 5 6 very many
8.	Figures, animals	none 1 2 3 4 5 6 very many
9.	Objects, manmade	none 1 2 3 4 5 6 very many
10.	Objects, nature	none 1 2 3 4 5 6 very many
11.	Places, manmade	none 1 2 3 4 5 6 very many
12.	Places, nature	none 1 2 3 4 5 6 very many
13.	Active activity, self	none 1 2 3 4 5 6 very many
14.	Active activity, others	none 1 2 3 4 5 6 very many
15.	Activity, manmade	none 1 2 3 4 5 6 very many
16.	Activity, nature	none 1 2 3 4 5 6 very many
17.	Passive activity, self	none 1 2 3 4 5 6 very many
18.	Passive activity, others	none 1 2 3 4 5 6 very many
19.	Action, implied	none 1 2 3 4 5 6 very many
20.	Events, manmade	none 1 2 3 4 5 6 very many
21.	Events, nature	none 1 2 3 4 5 6 very many
22.	Time, past	none 1 2 3 4 5 6 very many
23.	Time, present	none 1 2 3 4 5 6 very many
24.	Time, future	none 1 2 3 4 5 6 very many
25.	Consequences implied	not at all 1 2 3 4 5 6 very much
26.	Realistic imagery	not at all 1 2 3 4 5 6 very much
27.	Fantasy imagery	not at all 1 2 3 4 5 6 very much
28.	Situation initiated by self	not at all 1 2 3 4 5 6 very much
29.	Situation initiated by others	not at all 1 2 3 4 5 6 very much
30.	Inner focus of attention	not at all 1 2 3 4 5 6 very much
31.	Outer focus of attention	not at all 1 2 3 4 5 6 very much

Table 10

Examples of Images, Thoughts & Ideas

1. Number of thoughts
2. Number of images
3. Descriptive detail (number of modifiers, adjectives, adverbs)
4. Colour detail
5. Figures, self (I am involved)
6. Figures, others (other people are involved)
7. Figures, body parts (body parts are involved)
8. Figures, animals (animals are involved)
9. Objects, manmade (car, building, etc.)
10. Objects, nature (tree, sun, etc.)
11. Places, manmade (street, schoolroom, pub, etc.)
12. Places, nature (forest, seashore, valley, etc.)
13. Active activity, self (running, cooking, driving a car, etc.)
14. Active activity, others (others doing above)
15. Activity, manmade (flying, snowmaking, etc.)
16. Activity, nature (snowing, wind blowing, etc.)
17. Passive activity, self (reading, watching T.V., watching others, etc.)
18. Passive activity, others (others doing above)
19. Action, implied (about to do something)
20. Events, manmade (tennis tournament, parade, dance, etc.)
21. Events, nature (sunrise, fires, etc.)
22. Time, past (remembering)
23. Time, present (now)
24. Time, future (something in the future)
25. Consequences implied (something will happen because of this)
26. Realistic imagery (based on reality)
27. Fantasy imagery (based on fantasy)
28. Situation initiated by self (e.g. I am mad at someone)
29. Situation initiated by others (e.g. someone is mad at me)
30. Inner focus of attention
31. Outer focus of attention



Cervical spinal segments and roots

Thoracic spinal segments and roots

Lumbar spinal segments and roots

Sacral spinal segments and roots

NERVE SUPPLY

C_4	Diaphragm
C_5	Deltoid and biceps
C_6	Wrist extensors
C_7	Triceps
C_8	Hand
T_{2-7}	Chest muscles
T_{9-12}	Abdominal muscles
L_{1-5}	Leg muscles
S_{2-5}	Significant with with bowel, bladder and sexual function

Figure 1

NOTE: Adapted from C.P. Zejdlik, 1983.

Figure 2. Plotted Means and Standard Deviations of 24 Emotions Involving the Imagery Class, Inner Focus of Attention, for Able-Bodied & Disabled Groups

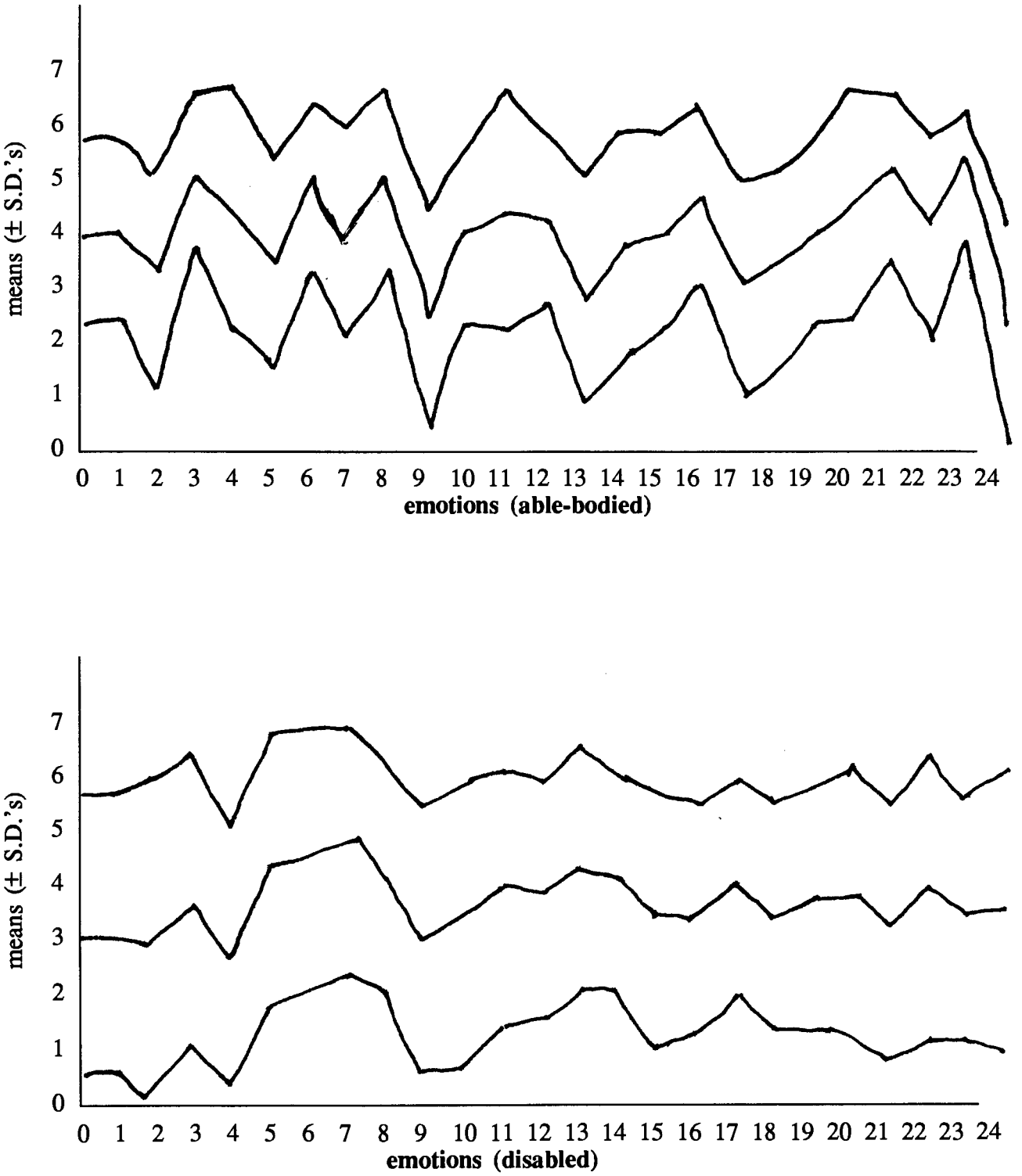


Figure 3. Ranked Means of 24 Emotions Involving the Imagery Class, Inner Focus of Attention, for Able-Bodied & Disabled Groups

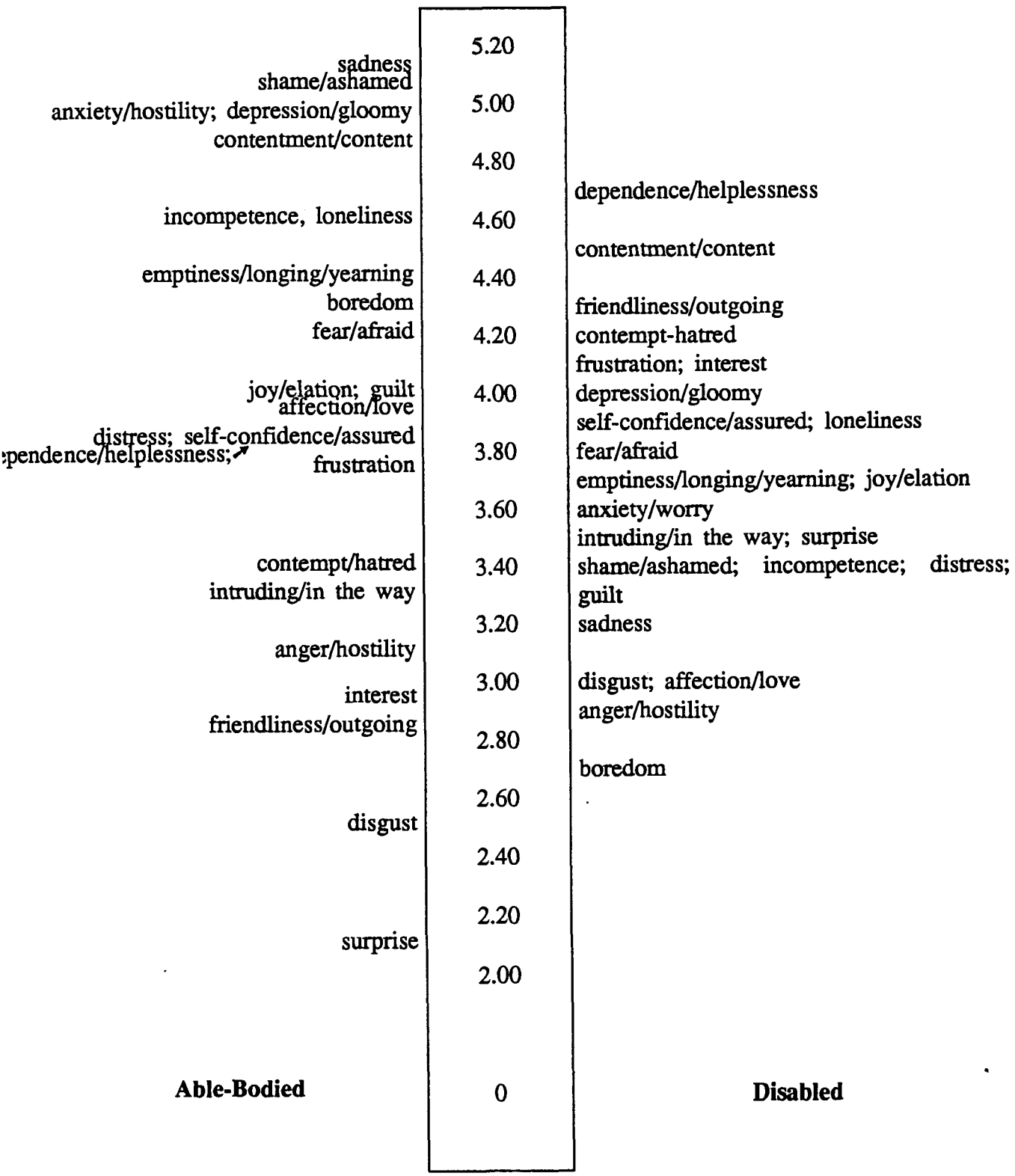


Figure 4

**Means for 24 emotions
at 31 Imagery Categories
for Able-Bodied & Disabled Groups**

	# Thoughts	# Images	Descriptive Detail	Colour Detail	Figures, self	Figures, others	Figures, body parts	Figures, animals	Objects, manmade	Objects, nature	Places, manmade	Places, nature	Active activity, self	Active activity, others	Activity, manmade	Activity, nature
affection, love																
able-bodied	4.00	4.55	3.70	3.10	3.60	4.15	2.55	1.40	1.70	2.50	2.75	3.35	3.25	3.40	2.10	2.40
disabled	4.00	3.70	3.15	3.15	3.20	4.05	3.15	1.00	1.60	2.05	2.35	1.90	2.70	3.65	2.25	2.10
anger, hostility																
able-bodied	4.75	4.65	4.20	3.10	3.95	4.50	3.20	0.85	3.15	1.40	3.85	2.10	4.55	4.05	3.70	1.85
disabled	4.15	4.10	4.00	2.85	4.10	4.25	2.40	0.70	1.70	1.45	1.55	1.60	3.00	2.45	2.25	1.70
anxiety, worry																
able-bodied	4.65	3.15	3.65	2.45	4.20	2.60	2.05	0.85	2.65	1.05	3.50	1.50	4.80	2.85	4.00	1.50
disabled	3.65	3.80	3.15	1.00	3.00	3.65	2.40	1.00	1.20	1.75	1.85	1.90	2.60	3.55	2.65	1.50
boredom																
able-bodied	3.95	3.00	3.25	2.05	4.15	3.15	1.50	0.85	3.20	1.25	3.90	1.80	2.15	1.70	2.45	1.30
disabled	2.80	2.80	2.40	2.55	2.30	1.75	1.30	0.35	2.25	1.90	2.45	2.00	1.90	1.45	1.85	1.55
contempt, hatred																
able-bodied	4.30	4.75	3.90	2.80	3.05	4.75	2.85	1.55	2.80	2.20	3.00	2.00	4.65	4.60	2.90	1.70
disabled	3.10	3.45	3.70	1.75	3.25	4.00	2.05	1.00	2.00	2.15	2.30	0.85	2.25	2.50	2.95	1.25
contentment																
able-bodied	3.90	3.75	3.35	3.20	4.50	2.85	2.10	1.65	2.90	3.95	2.70	4.10	3.10	2.40	2.40	3.10
disabled	4.25	4.30	4.45	3.70	4.10	3.40	2.50	0.55	2.70	2.80	2.90	4.35	3.05	2.10	2.90	2.65
dependance, helplessness																
able-bodied	3.85	3.00	3.50	2.15	3.80	3.40	2.10	1.05	3.00	2.00	3.25	2.55	3.25	3.05	2.65	2.40
disabled	4.80	4.90	4.50	3.10	4.65	3.90	4.40	1.05	3.55	2.20	3.20	2.45	3.65	2.30	3.10	2.25
depression, gloomy																
able-bodied	4.45	3.90	3.75	2.25	4.10	3.60	1.95	1.0	3.05	1.80	3.45	1.95	1.70	1.95	2.60	1.90
disabled	2.25	3.55	3.45	2.05	3.65	3.10	2.60	0.65	1.05	1.10	2.10	0.80	2.05	2.85	2.40	1.80
disgust																
able-bodied	3.50	4.60	4.40	3.70	2.60	4.20	2.35	1.55	3.35	1.70	3.30	2.00	2.20	3.95	2.95	1.75
disabled	3.25	3.70	4.15	2.85	2.45	2.90	3.15	1.00	2.45	1.50	2.15	0.90	1.65	2.30	1.70	1.15
distress																
able-bodied	3.75	3.85	3.60	2.60	4.60	3.10	1.85	1.15	3.55	2.10	3.65	1.65	3.95	2.95	3.00	1.90
disabled	2.60	2.90	3.20	2.15	2.70	2.40	2.95	1.15	2.95	1.45	1.90	1.95	2.60	2.10	2.25	1.55
emptiness, longing, yearning																
able-bodied	3.55	3.95	3.50	2.55	3.50	3.25	2.55	0.95	1.60	2.55	3.40	2.35	2.20	2.55	2.35	2.30
disabled	3.50	3.70	4.05	3.25	2.75	2.50	1.70	1.75	1.50	2.10	2.05	2.55	2.95	1.30	1.75	2.25
fear, afraid																
able-bodied	4.85	4.75	3.95	2.90	4.65	4.10	2.10	1.75	3.00	2.80	3.20	2.60	4.45	3.65	2.75	2.55
disabled	4.05	3.80	4.00	2.85	3.85	3.60	3.00	1.40	3.60	1.35	3.35	2.05	3.05	2.10	3.10	1.30
friendliness																
able-bodied	4.20	4.75	3.75	3.00	4.70	5.25	2.65	1.95	3.65	2.20	3.25	2.30	3.90	4.30	3.35	1.05
disabled	5.55	5.40	4.70	3.80	4.75	5.10	2.65	1.00	3.40	3.25	4.25	4.30	4.10	4.00	3.75	2.75

	Passive activity, self	Passive activity, others	Action implied	Events, manmade	Events, nature	Time, past	Time, present	Time, future	Consequences implied	Realistic imagery	Fantasy imagery	Situation initiated by self	Situation initiated by others	Inner focus of attention	Outer focus of attention	Marginal means
affection, love																
able-bodied	2.65	3.05	3.00	2.25	2.80	3.60	3.85	3.50	2.60	4.75	2.90	4.40	4.35	3.95	4.95	3.26
disabled	2.60	2.30	2.65	2.50	1.65	3.05	2.50	2.05	2.95	3.30	1.50	1.80	2.35	3.00	3.70	2.61
anger, hostility																
able-bodied	2.25	2.05	4.45	3.05	1.70	3.15	3.10	3.70	4.45	4.80	2.70	4.00	4.05	3.10	4.95	3.39
disabled	2.10	1.50	2.90	2.30	1.55	2.90	2.30	2.30	2.75	2.25	2.40	2.70	3.45	2.95	3.80	2.59
anxiety, worry																
able-bodied	2.35	1.85	4.10	2.95	1.35	2.80	3.10	4.55	4.75	4.50	2.20	4.70	3.00	5.00	3.00	3.08
disabled	1.65	1.40	3.35	1.60	1.90	2.90	3.30	3.45	3.25	3.80	2.40	2.40	3.75	3.65	2.10	2.56
boredom																
able-bodied	3.70	3.05	1.85	2.55	1.50	3.35	3.05	2.95	2.10	3.90	1.95	3.25	2.55	4.35	2.60	2.65
disabled	3.20	1.95	1.80	2.10	1.20	2.60	1.50	1.55	2.00	2.70	1.60	2.15	1.05	2.65	2.60	2.01
contempt, hatred																
able-bodied	2.35	2.35	3.20	3.15	1.75	4.25	3.40	2.80	4.00	4.45	2.40	4.15	4.55	3.35	5.15	3.32
disabled	2.40	1.70	2.75	1.90	0.90	2.85	3.00	2.60	3.70	4.50	1.95	2.80	2.80	4.15	3.80	2.59
contentment																
able-bodied	3.45	2.90	2.10	1.85	2.75	4.35	3.70	3.25	2.30	4.55	2.35	4.85	2.90	4.90	2.85	3.19
disabled	2.85	2.20	2.30	1.65	2.50	3.20	2.90	3.40	2.80	4.85	3.00	3.25	2.45	4.45	3.05	3.08
dependance, helplessness																
able-bodied	2.95	2.65	3.75	2.70	1.95	3.35	2.85	2.85	4.30	4.00	2.50	3.45	3.50	3.90	3.50	3.00
disabled	2.65	2.35	3.35	3.65	1.80	3.15	4.15	3.85	4.10	4.05	2.70	2.80	2.55	4.65	4.05	3.34
depression, gloomy																
able-bodied	4.05	2.60	2.20	2.95	1.80	3.70	3.00	2.70	2.90	3.90	2.25	3.90	3.50	5.00	2.40	2.92
disabled	2.95	2.90	2.00	2.15	1.90	2.75	3.25	2.20	2.45	3.95	1.85	3.20	2.90	4.05	3.20	2.51
disgust																
able-bodied	2.45	2.00	2.75	2.75	1.90	3.70	2.65	2.25	2.85	4.00	2.20	2.15	4.60	2.50	4.55	2.95
disabled	1.80	1.65	2.45	2.55	1.85	2.40	3.10	1.55	3.05	3.65	1.85	2.80	2.70	3.00	3.05	2.39
distress																
able-bodied	2.10	1.95	3.35	2.90	1.65	3.00	3.30	3.25	4.30	4.05	2.65	3.05	3.80	3.90	3.30	3.02
disabled	1.75	1.30	3.25	3.10	2.10	2.05	1.95	1.85	3.85	2.90	1.85	2.85	1.60	3.40	2.30	2.32
emptiness, longing, yearning																
able-bodied	3.50	2.70	2.75	2.10	1.80	3.50	3.40	2.75	3.45	3.85	3.15	3.40	3.40	4.40	2.85	2.90
disabled	2.75	1.70	1.95	2.30	2.25	2.60	3.30	3.20	2.30	3.50	2.45	2.40	2.50	3.75	2.60	2.55
fear, afraid																
able-bodied	2.35	1.95	4.40	2.90	2.20	3.35	2.90	3.45	4.85	4.05	3.25	2.95	4.55	4.25	4.05	3.40
disabled	2.05	2.00	3.95	2.95	2.45	3.40	3.90	3.25	3.90	3.85	1.75	2.80	2.65	3.80	3.85	2.96
friendliness																
able-bodied	2.60	2.80	3.35	3.30	2.10	4.50	3.55	3.55	3.30	4.30	2.70	4.65	3.40	2.90	5.15	3.46
disabled	2.70	2.80	4.70	4.15	2.95	4.20	4.05	3.65	3.70	4.30	2.55	3.65	3.55	4.25	4.15	3.79

	# Thoughts	# Images	Descriptive Detail	Colour Detail	Figures, self	Figures, others	Figures, body parts	Figures, animals	Objects, manmade	Objects, nature	Places, manmade	Places, nature	Active activity, self	Active activity, others	Activity, manmade	Activity, nature
frustration																
able-bodied	4.85	4.45	4.15	3.05	4.45	3.70	2.40	1.00	3.50	1.65	3.45	1.75	3.85	2.90	3.40	1.60
disabled	4.35	4.65	3.20	2.85	4.20	3.15	3.35	0.70	2.60	1.65	3.55	2.15	4.10	3.30	3.30	2.25
guilt																
able-bodied	4.10	3.75	3.40	2.80	3.55	3.70	1.85	1.05	2.80	1.35	3.30	2.20	3.60	3.15	2.40	1.50
disabled	2.50	3.05	2.80	2.25	2.50	1.75	2.15	0.45	1.15	0.85	1.80	0.70	2.30	2.25	1.95	0.55
incompetence																
able-bodied	4.65	3.55	3.45	2.00	3.85	3.90	1.55	0.85	3.30	1.25	3.95	1.30	3.65	3.35	3.45	1.10
disabled	2.85	2.80	2.55	1.90	2.90**	3.00	2.50	0.50	3.20	0.90	2.45	0.70	2.60	2.70	2.80	0.95
interest																
able-bodied	4.05	4.05	4.25	3.15	3.50	4.35	2.60	1.80	3.80	3.35	3.65	3.20	3.40	3.25	3.60	2.85
disabled	3.95	4.25	3.60	2.35	3.40	2.70	2.05	1.25	3.30	1.75	3.40	1.75	3.85	2.50	3.35	2.10
intruding, in the way																
able-bodied	3.80	2.70	2.90	1.95	3.45	4.30	1.65	0.80	3.05	1.35	3.55	1.50	2.95	3.65	2.55	1.55
disabled	3.35	3.60	3.30	1.95	3.45	4.25	3.00	0.70	2.70	0.95	2.85	1.05	2.50	3.35	2.80	1.50
joy, elation																
able-bodied	3.70	4.80	4.35	4.05	4.90	4.70	2.75	1.75	3.65	3.25	3.95	3.30	4.35	3.85	3.10	2.10
disabled	4.30	4.10	3.85	3.45	4.10	4.10	2.30	1.15	2.85	2.10	2.70	3.20	3.40	2.95	3.30	2.40
loneliness																
able-bodied	4.25	4.05	2.95	2.10	3.85	3.25	1.70	1.20	2.40	2.05	2.65	2.35	2.45	2.35	2.35	1.65
disabled	3.10	3.20	2.40	1.35	3.85	1.75	1.25	0.50	1.30	1.05	2.05	1.15	1.25	1.20	1.25	1.10
sadness																
able-bodied	3.95	3.75	3.80	2.25	3.75	3.70	1.75	1.60	2.55	1.80	2.65	2.30	1.85	2.35	2.15	2.20
disabled	3.25	3.20	2.80	2.15	3.20	3.10	1.85	1.50	1.85	1.55	2.40	1.40	1.75	1.20	1.60	1.55
self-confidence, assured																
able-bodied	4.65	3.85	3.90	3.50	4.55	3.85	2.30	1.35	3.15	2.35	3.40	2.55	4.40	3.10	3.30	2.35
disabled	4.50	4.30	4.10	2.45	4.20	4.40	2.95	1.10	3.35	1.90	3.15	2.40	4.25	3.25	3.05	1.55
shame, ashamed																
able-bodied	3.60	3.35	3.35	2.35	3.95	3.20	1.65	0.45	2.50	1.40	3.25	1.55	3.30	2.50	1.70	2.75
disabled	3.35	3.35	3.25	1.55	2.75	3.50	2.00	0.65	2.00	1.10	2.65	1.30	3.05	2.40	1.65	1.60
surprise																
able-bodied	3.05	3.50	3.85	3.45	3.70	4.10	1.80	0.90	3.45	1.40	3.75	1.45	3.10	3.80	2.40	1.70
disabled	3.70	3.45	3.20	2.35	3.45	4.40	3.05	0.80	3.20	1.95	2.95	1.95	2.50	3.15	2.45	1.75

	Passive activity, self	Passive activity, others	Action implied	Events, manmade	Events, nature	Time, past	Time, present	Time, future	Consequences implied	Realistic imagery	Fantasy imagery	Situation initiated by self	Situation initiated by others	Inner focus of attention	Outer focus of attention	Marginal means
frustration																
able-bodied	2.05	2.55	3.40	2.70	1.45	3.30	4.00	2.60	3.60	4.55	2.60	3.15	3.85	3.85	4.15	3.16
disabled	2.60	2.50	2.80	2.75	1.50	2.20	4.10	3.05	3.95	3.35	2.20	4.00	2.05	4.10	2.45	2.99
guilt																
able-bodied	3.05	2.70	3.35	2.80	1.40	3.95	2.35	2.85	4.60	4.00	2.75	4.05	3.50	4.00	3.45	3.01
disabled	1.85	1.30	2.35	1.80	0.75	2.20	1.85	2.00	3.15	3.15	1.95	2.85	1.90	3.40	2.40	1.99
incompetence																
able-bodied	2.75	2.60	3.35	3.45	1.10	3.90	2.85	2.60	4.45	3.95	2.70	4.40	2.95	4.60	3.65	3.04
disabled	1.90	1.25	2.85	2.60	1.25	2.45	2.30	2.55	2.75	3.80	1.65	2.55	2.45	3.45	3.20	2.33
interest																
able-bodied	3.00	2.30	3.20	3.55	2.05	3.15	3.35	3.70	3.15	4.25	2.95	4.30	3.00	2.95	4.75	3.37
disabled	2.95	1.95	3.15	3.20	1.90	1.90	3.65	4.00	3.85	3.70	2.50	3.10	2.85	4.10	3.55	2.96
intruding, in the way																
able-bodied	2.60	2.45	2.80	2.75	1.35	3.30	2.15	2.35	3.10	4.10	1.95	3.35	3.37	3.30	4.00	2.72
disabled	1.60	2.55	3.00	3.35	1.15	3.05	3.60	2.50	3.35	3.45	1.65	3.25	3.60	3.35	3.10	2.71
joy, elation																
able-bodied	1.85	2.15	3.30	3.45	2.65	4.10	3.80	3.30	2.90	4.80	2.80	4.40	3.85	4.00	4.25	3.55
disabled	2.55	2.35	3.45	2.85	2.50	3.65	2.45	3.70	3.20	3.50	2.80	2.80	3.00	3.75	3.60	3.11
loneliness																
able-bodied	4.00	2.45	2.50	2.10	1.55	3.75	3.00	2.05	2.80	4.45	2.15	3.80	2.70	4.60	2.75	2.78
disabled	3.15	1.60	1.75	1.80	1.40	2.55	1.95	2.50	2.40	3.25	2.80	2.50	1.35	3.85	2.70	2.04
sadness																
able-bodied	3.35	2.80	2.50	2.35	1.90	4.15	2.85	2.35	2.90	4.70	2.90	3.00	4.45	5.10	3.15	2.93
disabled	2.45	1.90	2.30	1.70	0.85	4.35	2.70	2.15	3.35	3.65	1.90	2.65	2.40	3.15	2.35	2.33
self-confidence, assured																
able-bodied	2.40	3.15	3.20	3.80	2.20	4.25	3.05	3.50	3.30	4.75	3.25	5.00	3.00	3.90	4.05	3.39
disabled	2.20	2.70	4.55	3.10	2.15	4.55	4.40	3.55	4.40	4.80	3.25	4.35	3.00	3.85	3.75	3.39
shame, ashamed																
able-bodied	2.00	3.60	2.30	1.55	4.20	2.25	2.00	4.25	3.95	2.60	4.15	3.15	3.15	5.05	3.10	2.86
disabled	2.35	2.50	2.35	1.80	3.30	2.95	2.40	3.00	4.65	1.90	2.95	2.45	2.45	3.40	2.95	2.52
surprise																
able-bodied	2.50	1.85	2.80	3.70	1.55	3.00	2.50	2.20	2.85	4.55	1.45	1.65	4.75	2.10	4.55	2.82
disabled	2.65	1.85	3.20	3.50	2.25	3.45	3.70	2.80	2.20	3.45	1.45	1.85	3.50	3.55	2.95	2.79

Figure 5

**Standard Deviations for 24 emotions
at 31 Imagery Categories
for Able-Bodied & Disabled Groups**

	# Thoughts	# Images	Descriptive Detail	Colour Detail	Figures, self	Figures, others	Figures, body parts	Figures, animals	Objects, manmade	Objects, nature	Places, manmade	Places, nature	Active activity, self	Active activity, others	Activity, manmade	Activity, nature
affection, love																
able-bodied	1.77	1.60	1.59	1.71	2.11	2.20	1.66	1.31	1.62	1.43	1.74	1.78	1.68	1.98	2.19	2.01
disabled	2.47	2.65	2.70	3.16	2.46	2.48	2.43	1.86	2.54	2.80	2.18	2.53	2.90	2.70	2.98	2.59
anger, hostility																
able-bodied	1.48	1.56	1.64	1.37	1.87	1.98	1.96	0.58	1.75	0.99	1.66	1.86	1.66	2.03	1.89	1.69
disabled	2.54	2.57	2.75	2.64	2.54	2.55	2.64	1.26	2.31	2.54	1.79	2.41	2.73	2.70	2.44	2.59
anxiety, worry																
able-bodied	2.03	1.81	1.81	1.70	1.73	2.11	1.95	0.58	1.69	0.88	1.43	1.23	1.36	2.13	1.97	1.19
disabled	2.64	2.35	2.54	1.41	2.61	2.70	2.18	2.15	1.73	2.51	2.05	2.44	2.64	2.80	2.59	2.66
boredom																
able-bodied	1.82	1.83	1.51	1.14	1.95	1.89	1.14	0.48	1.85	0.78	1.55	1.64	1.46	1.38	1.90	0.97
disabled	2.23	2.35	2.76	2.68	2.17	2.02	2.29	1.08	2.40	2.69	2.18	2.55	2.49	2.16	2.45	2.23
contempt, hatred																
able-bodied	1.78	1.33	1.37	1.50	1.60	1.44	1.59	1.66	1.43	1.70	1.80	1.77	1.34	1.39	1.91	1.62
disabled	2.75	2.60	2.75	2.59	2.75	2.67	2.62	1.97	2.59	2.81	2.77	1.87	2.19	2.83	3.25	2.35
contentment																
able-bodied	1.51	1.94	1.87	1.82	1.90	2.15	1.74	1.42	1.83	2.06	1.86	1.94	2.40	2.13	1.93	1.99
disabled	2.44	2.94	2.76	2.83	2.78	2.90	2.50	1.66	2.49	3.03	2.40	2.92	2.48	2.19	2.55	2.66
dependance, helplessness																
able-bodied	1.75	1.71	1.70	1.53	1.98	1.31	1.51	0.99	1.89	1.77	1.94	1.82	2.14	1.63	1.98	2.13
disabled	2.35	2.46	2.70	2.91	2.41	2.67	2.47	2.35	2.52	3.23	2.76	3.01	2.47	2.61	2.82	2.90
depression, gloomy																
able-bodied	1.93	1.99	1.61	1.61	2.19	2.23	1.60	0.68	2.23	1.10	2.03	1.23	1.38	1.19	1.98	1.37
disabled	2.26	2.72	2.54	2.56	2.62	2.71	2.47	1.63	2.23	1.41	1.61	1.67	2.35	2.92	2.76	2.56
disgust																
able-bodied	1.73	1.60	1.35	1.52	2.06	1.90	1.84	1.31	1.81	1.38	1.59	1.74	1.73	1.76	1.84	1.20
disabled	2.26	2.27	2.54	2.72	1.96	1.80	2.43	2.17	2.22	2.32	2.15	1.80	2.03	2.38	2.02	2.03
distress																
able-bodied	2.02	1.72	1.72	2.06	1.84	1.80	1.34	0.98	1.93	1.48	1.78	0.93	2.01	1.70	2.02	1.25
disabled	2.37	2.30	2.66	2.34	2.20	2.50	2.85	2.30	2.70	2.03	2.12	2.39	2.30	2.73	2.55	2.28
emptiness, longing, yearning																
able-bodied	1.60	1.66	1.23	1.35	1.68	1.94	2.11	0.60	1.31	2.13	1.69	1.69	1.73	1.93	1.56	1.55
disabled	2.78	3.11	3.15	3.05	2.46	2.87	1.92	2.71	2.52	2.67	2.46	3.01	2.39	2.17	2.44	2.48
fear, afraid																
able-bodied	1.59	1.20	1.82	1.74	1.06	1.61	1.65	1.16	1.37	1.39	1.90	1.69	1.50	1.98	2.19	1.87
disabled	2.78	2.94	2.97	2.68	2.85	2.70	2.77	2.13	2.85	1.89	2.75	2.50	2.68	2.46	2.76	1.89
friendliness																
able-bodied	1.43	1.80	1.44	1.77	1.80	1.02	1.53	1.76	1.78	1.57	2.12	1.62	1.91	1.65	2.20	1.82
disabled	2.11	2.28	2.82	2.74	2.98	2.47	2.72	1.83	2.52	3.05	2.65	2.84	2.51	2.44	2.88	3.00

	Passive activity, self	Passive activity, others	Action implied	Events, manmade	Events, nature	Time, past	Time, present	Time, future	Consequences implied	Realistic imagery	Fantasy imagery	Situation initiated by self	Situation initiated by others	Inner focus of attention	Outer focus of attention
affection, love															
able-bodied	1.66	1.66	1.94	1.80	1.79	2.23	1.56	2.41	1.93	1.68	1.77	1.87	1.59	1.70	1.63
disabled	2.62	2.53	2.54	2.58	2.18	2.64	2.14	2.11	2.80	2.59	2.43	2.04	2.20	2.47	2.45
anger, hostility															
able-bodied	1.77	1.76	1.93	1.84	1.34	1.84	1.99	2.08	1.79	1.73	1.68	2.10	2.08	1.97	1.87
disabled	2.22	2.62	2.43	2.92	2.21	2.80	2.86	2.71	2.63	2.42	2.78	2.53	2.87	2.80	2.48
anxiety, worry															
able-bodied	2.00	1.81	1.91	1.93	1.22	1.88	2.15	1.93	2.12	1.50	1.93	1.86	2.00	1.41	2.07
disabled	2.45	2.60	2.66	1.66	2.44	3.09	2.88	3.05	2.67	2.72	2.79	2.85	2.69	2.45	1.83
boredom															
able-bodied	2.00	2.32	1.72	1.76	1.05	2.20	2.16	2.37	1.65	1.80	1.53	1.94	1.95	2.11	1.69
disabled	2.62	2.64	1.70	2.90	2.26	2.47	2.01	2.08	2.36	2.31	2.13	2.68	2.03	2.36	2.90
contempt, hatred															
able-bodied	1.89	1.38	1.67	2.08	1.29	1.37	1.84	2.09	1.86	1.43	1.63	1.92	1.73	1.87	1.28
disabled	2.04	2.36	2.44	2.57	1.61	2.15	2.81	2.94	2.75	2.41	2.74	2.33	2.68	2.56	2.41
contentment															
able-bodied	1.98	2.15	1.77	1.84	2.19	2.00	1.97	2.22	2.15	1.57	1.95	1.75	2.10	1.37	1.69
disabled	2.64	2.70	2.51	1.95	2.30	2.70	2.53	2.96	2.52	2.18	2.99	2.91	2.78	2.41	2.76
dependance, helplessness															
able-bodied	1.63	1.53	2.02	2.08	1.60	1.95	2.15	2.08	1.72	1.77	2.03	2.23	1.93	1.91	2.11
disabled	2.85	2.66	2.43	3.04	2.68	2.81	2.80	2.62	2.51	2.50	2.84	2.58	2.54	2.32	2.56
depression, gloomy															
able-bodied	2.06	1.75	1.70	1.95	1.50	2.15	2.29	1.68	2.02	1.97	2.06	2.07	2.14	1.68	1.84
disabled	2.39	3.00	2.12	2.64	2.63	2.61	2.44	2.35	2.60	2.50	2.92	2.62	3.22	2.25	2.62
disgust															
able-bodied	1.73	1.17	1.83	1.51	1.55	1.86	1.89	1.65	1.72	1.58	1.54	1.81	2.06	1.85	1.70
disabled	2.19	2.03	2.62	2.52	2.81	2.28	2.78	2.11	2.25	2.41	2.41	2.44	2.47	2.36	2.50
distress															
able-bodied	1.61	1.39	1.87	1.99	0.87	1.83	2.05	2.48	2.10	1.78	1.87	1.79	1.93	1.51	1.92
disabled	2.26	2.02	2.67	2.93	2.55	2.32	2.25	2.20	2.58	2.48	2.49	2.97	2.50	2.32	2.45
emptiness, longing, yearning															
able-bodied	1.85	1.75	1.51	1.51	1.43	1.82	2.03	1.86	2.13	1.38	1.89	1.93	2.08	2.13	2.20
disabled	2.55	2.02	2.23	2.45	2.31	2.32	2.57	2.60	2.34	2.43	2.74	1.98	2.60	2.42	2.72
fear, afraid															
able-bodied	1.66	1.46	1.69	2.15	1.70	2.00	1.77	2.18	1.53	1.79	2.22	1.57	1.87	1.48	2.01
disabled	2.39	2.65	2.64	2.54	2.92	3.16	23.86	2.71	2.53	2.66	2.24	2.56	2.58	2.23	2.34
friendliness															
able-bodied	1.87	2.01	2.11	1.97	1.83	1.93	1.98	2.16	2.08	2.00	1.83	1.81	1.87	1.94	1.04
disabled	2.79	2.93	2.38	2.66	2.85	2.58	2.56	2.72	2.99	2.57	2.56	3.08	2.60	2.24	2.49

	# Thoughts	# Images	Descriptive Detail	Colour Detail	Figures, self	Figures, others	Figures, body parts	Figures, animals	Objects, manmade	Objects, nature	Places, manmade	Places, nature	Active activity, self	Active activity, others	Activity, manmade	Activity, nature
frustration																
able-bodied	1.34	1.63	1.08	1.70	1.46	2.05	1.84	0.79	1.73	1.34	1.63	1.61	1.53	2.17	2.11	1.63
disabled	2.49	2.36	2.56	2.83	2.19	2.79	2.85	1.41	2.64	2.54	2.48	2.81	2.57	2.53	2.75	2.88
guilt																
able-bodied	1.44	1.68	1.50	1.50	1.79	1.78	1.30	0.75	1.67	1.18	1.49	1.73	2.01	1.78	1.75	1.53
disabled	2.21	2.64	2.64	2.86	2.21	2.35	2.72	1.19	1.87	2.00	1.96	1.83	2.25	2.57	2.41	1.23
incompetence																
able-bodied	1.72	1.82	1.53	1.37	2.03	1.74	0.94	0.48	1.49	0.96	1.39	0.80	1.81	2.08	2.13	0.78
disabled	1.92	2.39	2.80	2.02	2.33	2.27	2.76	1.14	2.48	2.19	1.90	1.41	1.95	2.36	2.56	1.63
interest																
able-bodied	1.95	2.06	1.55	1.81	2.03	1.87	1.98	1.79	1.88	2.25	1.87	2.06	2.08	1.91	1.75	1.78
disabled	2.23	2.35	2.89	2.15	2.45	1.80	2.03	1.94	2.05	2.53	2.21	2.42	2.34	2.50	2.62	2.49
intruding, in the way																
able-bodied	1.57	1.03	1.33	1.31	1.82	1.49	1.38	0.52	1.04	1.97	1.66	1.78	1.88	1.61	1.23	1.95
disabled	2.25	2.18	2.57	2.39	2.30	1.97	2.49	1.65	2.00	2.66	2.18	2.39	2.45	2.30	2.25	2.80
joy, elation																
able-bodied	1.72	1.00	1.49	1.50	1.61	1.41	1.91	1.65	1.34	1.88	1.53	1.83	1.38	1.82	1.99	1.65
disabled	2.55	2.71	2.54	2.80	2.69	2.38	2.13	2.15	3.01	2.31	2.49	2.89	2.62	2.70	2.40	2.62
loneliness																
able-bodied	1.61	1.73	1.87	1.91	1.50	1.02	1.81	2.02	1.12	0.95	1.56	1.93	1.34	1.53	1.63	1.75
disabled	2.12	2.23	2.01	2.32	2.70	2.25	2.60	1.77	1.91	1.53	2.05	1.79	1.50	1.84	1.94	2.09
sadness																
able-bodied	1.76	1.55	1.96	1.44	1.88	1.80	1.29	1.42	1.43	1.24	1.38	1.75	1.34	1.53	1.18	1.73
disabled	2.48	2.39	2.44	2.20	2.52	2.75	2.15	2.16	2.20	2.25	2.23	2.16	2.04	1.36	1.50	2.03
self-confidence, assured																
able-bodied	1.26	1.69	1.25	1.87	1.79	1.63	1.49	1.49	1.66	1.84	1.87	1.82	1.75	1.88	2.08	1.89
disabled	2.14	2.65	2.61	2.46	2.37	1.90	2.46	2.12	2.47	2.42	2.47	2.61	2.75	2.61	2.56	2.01
shame, ashamed																
able-bodied	1.69	1.46	1.34	1.56	1.82	1.70	1.26	0.82	1.50	1.04	1.86	1.23	1.75	1.75	1.87	1.34
disabled	2.20	2.43	2.40	1.87	1.91	2.35	2.47	1.69	2.20	1.80	2.60	1.75	2.28	2.50	2.39	1.72
surprise																
able-bodied	1.87	1.85	1.59	1.98	2.08	1.88	1.28	0.64	1.98	1.09	1.71	1.19	1.94	1.96	1.75	1.45
disabled	2.40	2.39	2.50	2.56	2.58	2.32	2.03	1.67	2.11	2.70	2.28	2.72	2.68	2.64	2.39	2.42

	Passive activity, self	Passive activity, others	Action implied	Events, manmade	Events, nature	Time, past	Time, present	Time, future	Consequences implied	Realistic imagery	Fantasy imagery	Situation initiated by self	Situation initiated by others	Inner focus of attention	Outer focus of attention
frustration															
able-bodied	1.73	1.82	2.01	2.02	1.50	2.15	2.20	2.25	1.72	1.35	1.90	1.81	2.05	2.00	2.15
disabled	2.47	2.41	2.46	2.46	1.96	2.37	2.49	2.41	2.96	2.25	2.56	2.86	2.56	1.91	2.03
guilt															
able-bodied	2.11	1.75	1.59	2.04	1.50	2.01	1.75	2.15	1.53	1.80	2.14	1.87	2.16	1.80	1.79
disabled	2.49	2.10	2.56	2.28	1.48	2.30	2.18	2.67	2.64	2.45	2.43	2.43	2.04	2.39	2.30
incompetence															
able-bodied	1.74	1.90	1.75	1.70	0.78	2.17	2.13	2.13	1.76	1.53	2.22	1.35	1.87	1.56	1.59
disabled	2.10	2.02	2.47	2.58	1.86	2.23	2.15	2.85	2.02	2.09	2.23	2.28	2.21	2.16	2.82
interest															
able-bodied	2.20	1.83	2.06	1.76	1.50	2.03	2.36	2.08	2.08	1.61	2.13	1.72	1.86	1.84	1.91
disabled	2.39	1.93	2.68	2.37	2.15	2.15	2.72	2.53	2.43	2.51	2.74	2.84	2.77	2.07	2.50
intruding, in the way															
able-bodied	1.73	1.94	1.04	1.97	1.66	1.78	1.88	1.61	1.23	1.95	1.52	1.75	1.87	1.70	1.89
disabled	2.42	2.90	2.00	2.66	2.18	2.39	2.45	2.30	2.25	2.80	2.60	2.18	2.62	2.58	2.51
joy, elation															
able-bodied	1.85	1.42	1.34	1.88	1.53	1.83	1.38	1.82	1.99	1.65	0.98	1.49	1.46	1.65	1.37
disabled	2.50	2.60	3.01	2.31	2.49	2.89	2.62	2.70	2.40	2.62	2.41	2.45	2.73	2.31	2.23
loneliness															
able-bodied	1.39	1.43	1.12	0.95	1.56	1.93	1.34	1.53	1.63	1.75	1.98	0.98	1.32	2.06	1.61
disabled	2.64	2.59	1.91	1.53	2.05	1.79	1.50	1.84	1.94	2.09	1.99	1.37	1.72	2.51	2.65
sadness															
able-bodied	1.68	1.89	1.43	1.24	1.38	1.75	1.34	1.53	1.18	1.73	1.87	1.96	1.73	1.44	1.63
disabled	2.40	2.92	2.20	2.25	2.23	2.16	2.04	1.36	1.50	2.03	2.32	2.04	2.60	2.39	2.25
self-confidence, assured															
able-bodied	2.33	1.52	1.66	1.84	1.87	1.82	1.75	1.88	2.08	1.89	1.66	1.72	1.58	1.86	1.73
disabled	2.94	2.45	2.47	2.42	2.47	2.61	2.75	2.61	2.56	2.01	2.74	2.57	2.59	2.66	2.48
shame, ashamed															
able-bodied	2.18	1.69	1.50	1.04	1.86	1.23	1.75	1.75	1.87	1.34	1.74	1.33	1.95	1.23	1.74
disabled	2.15	2.62	2.20	1.80	2.60	1.75	2.28	2.50	2.39	1.72	1.66	2.25	2.35	2.16	2.39
surprise															
able-bodied	1.78	1.63	1.98	1.09	1.71	1.19	1.94	1.96	1.75	1.45	1.87	1.53	2.14	1.88	2.25
disabled	1.97	2.39	2.11	2.70	2.28	2.72	2.68	2.64	2.39	2.42	2.28	2.28	2.96	2.60	2.48

APPENDIX

I. Imagery and Thought Coding

The thoughts and imagery were scored for quality and referents.

1. Number of Thoughts

Entails attempting to determine the number of thoughts that do not involve imagery. For example: 1) walking down the street; 2) another person bumping into you; 3) feel angry; 4) thought of retaliation. Number 4 could be classified as a thought without imagery.

More commonly, it is fairly difficult to separate thoughts and images. Some images and thoughts may substitute for one another. For example, the image of falling rain may be genetic to and functionally equivalent to the imageless thought, "it is raining", and both may lead to carrying an umbrella.

The greater and more complex the thoughts accompanying an emotion, the harder it is to separate from the probable imagery.

2. Number of Images

There was generally no difficulty in determining the number of images when the imagery was simple and straightforward. For example, when imagining the experience of joy which involves: 1) being in a park on a sunny day; 2) feeling the warmth of the sun; 3) hearing the birds singing and children laughing. In this example there were four distinct images.

When the images were complex and overlapping, the imagery becomes much more difficult to separate. Generally each element, object, place, or action in a complex image was counted as a separate image, if it was complete enough to be an image in itself. For example, using the previous experience of joy if one was to include more complex imagery such as: 1) being in a park on a sunny day; 2) sensing that the first warmth of the sun is renewing the life in the park, such as the birds that are singing while feeding off the worms in the grass; 3) the sun also giving renewed vitality to the children laughing while running after the birds.

This image, while all part of the same scene, was broken down into separate images, because although part of the same scene, they were attended to separately, and were not intrinsic elements of the whole scene. That is, having children laughing in the scene is a separate image from the rest of the scene, while the fact that the sun is warm is an intrinsic element.

3. **Colour Detail**

This category included the number of colour references (i.e. "red shirt", "green leaves"), specifically mentioned in the image. Although an image of the leaves may seem to imply that it is intrinsically green, this category was not tallied unless the colour was specifically involved.

4. **Descriptive Detail**

All descriptive modifiers, adjectives, adverbs, and phrases that refer to qualify or describe the figure, object, or place of the image were included in this category, including colour, time, etc. All descriptions (each coherent whole coded as one) were included in this category. For example, in the image "an intruder in a blue ski mask" would involve four descriptive adjectives: 1) "intruder", stipulating a figure; 2) "in a", placing a mask on the intruder; 3) "blue", describing the colour; 4) "ski mask", describing what the intruder is wearing.

Image Referents

1. **Figures**

The number of figures present and specifically mentioned in the imagery was counted. When no figure or number of figures was mentioned, groups of figures were counted as one per group.

The "figures" category included four mutually exclusive sub-categories:

a) Figures, self. All references to the respondent himself were counted as a separate category, including both respondentive and objective references (that is, the respondent could be either participating in the imagery, or observing himself objectively). This category was only coded if specific reference was made to the self ("I was talking to a friend"); or if this reference was indirect, but clearly implying the subject (i.e., "a group of us was talking").

b) Figures, others. This category included the number of figures or groups of figures specifically mentioned in the imagery, who were not fantasy figures or the subject himself.

c) Figures, body parts. This category included the number of references to parts of the body: arms, legs, eyes, etc.

d) Figures, animals. This category included the number of references to animals: cats, cogs, horses, etc.

3. **Objects**

This category included the number of distinct, specifically mentioned manmade and natural objects in the image. The "objects" category included two mutually exclusive sub-categories:

a) Objects, manmade. All manmade objects of any sort, including cars, buildings, clothing, etc.

b) Objects, natural. All inanimate natural objects, including trees, sun, water, dirt, etc.

4. **Places**

This category included the number of places in which the image occurs, if specifically mentioned in the imagery. The "places" category included two mutually exclusive sub-categories:

a) Places, manmade. This category included streets, schoolroom, cities, etc.

b) Places, natural. All natural settings, such as the forest, seashore, valleys, etc.

5. **Activity**

Actions or movements in the image that were specifically mentioned. This category included six sub-categories:

a) Active activity, self. This category included the number of distinct, specifically mentioned active actions or movements that involved the self. Examples include running, cooking, driving, etc.

b) Active activity, others. All references that include the number of distinct, specifically mentioned active actions or movements that do not involve the subject himself. These include other people running, cooking, driving, etc.

c) Activity, manmade. All references that involve the number of distinct, specifically mentioned actions or movements that are manmade. Examples include flying, snowmaking, etc.

d) Activity, natural. All references that involve the number of distinct, specifically mentioned actions or movements that occur in nature. These include snowing, wind blowing, raining, etc.

e) Passive activity, self. All references that involve the number of distinct, specifically mentioned passive actions or movements that involve the self. These include reading, watching television, watching others, etc.

f) Passive activity, others. All references that involve the number of distinct, specifically mentioned passive actions or movements that do not involve the subject himself. Examples include other individuals reading, watching television, etc.

g) Action implied. This category included the number of actions implied, present and specifically mentioned in the imagery by the subject. This involved the broad category, "About to do Something". An example would be, "I was about to angrily confront my close friend."

6. **Events**

This category included the number of distinct, specifically mentioned manmade and natural events in the imagery. There were two mutually exclusive sub-categories:

a) Events, manmade. All manmade events of any sort including tennis tournament, parade, dance, etc.

b) Events, nature. All natural events that are not manmade. Examples include sunrise, sunset, fires, storms, etc.

7. **Time**

All time references, either specifically mentioned, or implied by the nature of the references, were included in this category. Three mutually exclusive sub-categories were involved:

a) Time, past. All references to the past were scored, including references to past figures or events. For example, my previous girlfriend, the last long weekend, etc.

b) Time, present. Since one can assume most imagery will be in the present tense, this category was scored only if it was specifically mentioned. As an example, "I am now working out with weights."

c) Time, future. All references to the future were scored, including future figures or events. For example, moving into my new home next month, etc.

8. **Consequences Implied**

This category included the number of consequences implied present, and specifically mentioned in the imagery by the subject. This involved the broad category, "Something will happen because of this." As an example, "I tried unsuccessfully to scale the cliff."

Quality of the Image

1. **Imagery**

This category was scored by using the number of images as the number of simple or complex images. The complex image was scored as one in this categorization. The "imagery" category included two mutually exclusive categories:

a) Realistic Imagery. All references to realistic imagery were scored in this category. An example would be, "The traffic sped by at a high rate of speed."

b) Fantasy Imagery. All references to fantasy imagery that were unlikely or impossible to have occurred to the respondent were scored in this category. As an example, "I felt as if I were flying."

2. **Initiated Situation**

This category included the number of images in which the situation was initiated by the subject or by others. The two mutually exclusive sub-categories were:

a) Situation initiated by self. This category included the number of distinct, specifically mentioned initiated situations that involved the self. That is, the respondent was participating in the images. An example would be, "I am mad at that store clerk."

b) Situation initiated by other. This category included the number of distinct, specifically mentioned initiated situations that do not involve the respondent himself. That is, the respondent was observing in the images. As an example, "The police officer was mad at my friend."

3. **Focus of Attention**

This category included the number of images in which the respondent either focused attention inward or outward. The "focus of attention" category included two mutually exclusive sub-categories:

a) Inner focus of attention. All references by the subject to an inner focus of attention were scored in this category. For example, "I thought about my childhood."

b) Outer focus of attention. All references by the subject to an outer focus of attention were scored in this category. As an example, "I watched the children play on the swings."

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