This dissertation examines the efficacy of a multidisciplinary team approach to chronic pain. It is organized into three main sections. The first, introductory, section describes current pain concepts, treatment approaches to chronic pain, outcome studies and methodological issues in outcome research. In the second, empirical, section three studies are presented. The first study examines the effectiveness of the treatment package of a Dutch Multidisciplinary Pain Center. In the second study, the characteristics of a group of subjects with chronic pain who do not rely on health care providers (any longer) for a solution to their pain problem are described. The third study addresses the effectiveness of a pain management program. The last section of this dissertation presents a general discussion and suggestions for further research.

In Chapter One a multidimensional perspective on pain is outlined. After World War II it has gradually become clear that a unidimensional model of pain, pain viewed as a specific sensory experience directly and proportionally related to nociceptive input, is becoming obsolete in the light of the increasing knowledge about the complexity of pain. A multidimensional approach, accounting for both physiological and psychological factors, does more justice to the complex nature of pain. In this chapter, the multidimensional model of pain as proposed by Loeser (1980) is followed in a review of the current notions of pain. As a consequence of the changed ideas about pain, a distinction has been made between acute and chronic pain. An outline is given of the relevant psychological models of chronic (intractable) pain. Specifically, a Stress-response model of chronic pain is presented in more detail because it serves as a guiding model for the empirical studies. In this model, the variables that affect adjustment to chronic pain are described, i.e., cognition, coping and social support. Chronic pain is, in this model thought to be a stressor. As such, this conceptualization, according to the definition of pain as proposed by the International Association for the Study of Pain, states that pain is always an unpleasant emotional experience. A reason for the use of this perspective is that a multidisciplinary approach to chronic pain is often characterized by 'caring' instead of 'curing'. Consequently, treatment goals often focus on adjustment (e.g., affective distress, activity levels and pain distress). Furthermore, parameters of adjustment are widely applied outcome measures of pain treatments.

In Chapter Two the multidisciplinary treatment perspective of chronic (intractable) pain, its evaluation and the methodological problems encountered in such studies, the measures used and the prediction of outcome in which they result are outlined. Critical attention is given to the operationalization of the concept of 'success'. Moreover, taxonomic aspects are dealt with. A profuse variety in treatments was found. Treatments may differ not only in their kind and number of components, but also in the manner in which treatments are administered. Furthermore, treatment facilities may differ in the characteristics of their pain populations because of referral characteristics, geographical aspects, demographic aspects and because of the applied admission criteria. Consequently, multidisciplinary treatment of pain should be seen as a generic term for a variety of treatment approaches that have a
multidimensional view of pain in common. The operant and cognitive treatment perspectives are outlined in more detail. Both perspectives represent widely applied treatment approaches to chronic pain. These treatment perspectives are important here for two reasons. First, the basic principles applied by these approaches match the underlying principles of the treatments presented in the empirical chapters in particular. Second, treatment outcome research most often refers to an operant and/or cognitive approach. It is concluded that the multidisciplinary approach in its broadest sense, has been found to be effective in several ways. The efficacy of the multidisciplinary approach is, however, difficult to establish, because most outcome studies show methodological and/or statistical omissions and shortcomings. Some topics have been addressed concerning the methodological adequacy of these outcome studies. These issues may be categorized as follows: (a) theoretical problems, (b) program variables, (c) patient variables, (d) outcome measures, and (e) methodological problems. It is concluded that the present state of the art indicates that every pain center should assess the characteristics of their patients, the reliability and validity of their outcome measures and, consequently, establish the efficacy of their treatments.

Chapter Three presents the results of preliminary analyses that were necessary for reasons of interpretability and comparability. A reduction was necessary in the relatively high number of variables applied in our studies. By means of data condensation techniques (Simultaneous Component Analysis) ten composite variables were derived in a way that makes comparisons between groups possible. Furthermore, the new variables matched the parameters of a Stress-response model of chronic pain. It was found that the cognitive variable distorted cognition predicted a statistically significant amount of variance in the variables that represent adjustment to chronic pain, i.e., pain distress, affective distress and general activity. Other cognitive and coping variables showed a less meaningful relationship with the 'adjustment' variables. The moderator variable, social support, predicted a significant amount of variance in the 'adjustment' variable pain distress, but showed no significant relationship with affective distress and general activity. Finally, patient profiles based upon a taxometric approach were studied. Although classification of profiles was based upon American criteria, it was concluded that this need not be a major objection.

In Chapter Four and Chapter Five the effectiveness of the treatment package for chronic pain of the Multidisciplinary Pain Center (MPC) of the University Hospital of Groningen is evaluated. Chronic pain patients that were referred to the MPC participated in this study (n=219). Heterogeneity in unselected pain problems and a variety of treatment procedures is the main feature of the MPC, as in all Dutch multidisciplinary pain centers. The 'ultimate question' for a center may be expressed as: 'What treatment, by whom, is most effective for this individual with that specific problem, and under which set of circumstances?'. This question is, however, difficult to answer, given the types of patients and the number of possible treatments. Consequently, a study on the efficacy of a multidisciplinary approach to chronic pain, that is, the efficacy of the treatment package as a whole, should be initially investigated.
Heterogeneity does certainly apply to the type of pain problems that were presented by the patients. However, the main pain categories are chronic low back pain and headache, generally the most frequent categories observed in pain centers. Patients did not differ much in their pain patterns, usually the pain is of a continuous character, with or without fluctuations. Furthermore, referred patients are most often female, middle aged, poorly educated, and without employment, partly because of their pain. Many patients received financial benefits because of their pain problem (43%). Most of the patients had received extensive treatment elsewhere, apparently without clear success. Nearly half the patients (47.6%) received a unimodal treatment. In 27.6% of the cases patients received more than one treatment. Clearly, heterogeneity in treatment strategies was observed. At subjective levels the treatment package was found to be successful, i.e., in 58% of the cases a positive treatment effect was observed by the specialist and 60% of the patients reported reduction in experienced pain intensity levels. Most patients judged their health as being improved after treatment. However, these ratings may be subject to various confounding influences (e.g., reactivity of these ratings).

The second part of this study, described in Chapter Five, is more exploratory. At a statistical level the research-findings did suggest that the treatment-package of the MPC was effective in general. Patients showed a decrease in pain intensity, pain distress, affective distress, distorted cognition, external coping, seeking support and social support and an increase in general activity, uptime and internal coping. Moreover, these significant improvement was found. Follow-up levels showed no regression to the pretreatment levels. The stabilization or even further improvement of our outcome data, gives evidence opposing the idea that treatment results merely reflect temporal confounding factors. Our analyses showed that the percentage of clinically relevant change (RC-scores) is low to modest for most variables. On these grounds one could question the efficacy of the treatment package of the MPC and results are open for debate. Yet, there are some issues concerning the use of clinical change measures that suggests that interpreting results in terms of clinical significance should be done cautiously. Treatment outcome is very poorly predicted by sociodemographic, pain related, treatment history related, and pretest levels of cognitive variables. It is suggested that these findings are partially a result of the heterogeneity in patients and treatments. Subgroups were created based upon the characteristics of pain patients, the characteristics of the pain complaint and treatment category. In this way the following questions may be studied: Is there a differential treatment-effect for type of patient, type of pain problem and treatment category? Also interactional effects may be studied, i.e., is the outcome of treatment more pronounced for a specific type of patient with a specific type of pain problem, given a specific treatment? The various patient profiles did not yield a differential treatment effect, neither did patients with a different type of pain problem. The levels of the latter subgroup, however, showed differences in sociodemographic and pain related variables. Different types of pain are associated with differences in pain related variables, such as pattern and, as a consequence, types of pain may have different
consequences for employment and compensation. Clear differential effects were found for the grouping variable treatment category. Although the group that did not receive a treatment showed no improvements on most measures, it cannot be considered to be a true control group because several members of this group were referred to a specialist elsewhere or to their general practitioner. Still, this outcome indicates at least that after instigation of a treatment, outcome may reflect in part therapeutic factors. The specificity of these factors remained unclear, however, because no differential treatment effect was found for those patients that received treatment. The finding that the no-treatment group was least satisfied with the treatment regime was not surprising. For the group that received treatment, satisfaction was found to relate significantly to experienced outcome. Although satisfaction may also relate to other factors, it is determined here most strongly by outcome.

Furthermore, no significant effects were found for the between-subjects interactions. Although it was expected that different types of patients would benefit most from different specific treatment categories, this interaction failed to reach significance. As was pointed out earlier, the heterogeneity of patients and treatments may have leveled out differential treatment effects.

In Chapter Six a study is presented that was conducted with a group of patients (n=186) with chronic pain who did not consult physicians for a solution to their pain problem. First, these so-called Non-consumers were compared with chronic pain patients. Group differences were found for the cognitive variables. Non-consumers showed lower levels of distorted cognition, such as catastrophizing and negative self-efficacy, and are more internally oriented. Differences were also found for pain related coping strategies. Non-consumers more often used internal coping strategies, whereas the Consumer group is more often characterized by an external approach (wishful thinking) and seeking support. Consumers showed lower levels of activity, experienced more pain distress, such as interference or impediment in their functioning by pain and judged their pain as more severe. Moreover, differences were found for affective distress, although the direction of the differences was opposite from what was expected, showing Non-consumers to be more emotionally distressed. Although, both groups differed in the duration of pain, this gave no explanation for the group differences.

In the next series of analyses, the Non-consumer subgroups were compared. In addition, analyses were run to study the differential effects of these subgroups when compared with the Consumer group. The difference between both subgroups is based upon the distinction 'having learned or not having learned to live with pain'. Differences were only found for the cognitive variables distorted pain cognition, internal orientation and the variable internal coping. The group 'that has learned to live with their pain' showed the lowest levels of distorted cognition and the highest levels of internal orientation and internal coping. Differential effects showed that this subgroup accounted for the main differences between the Non-consumer and Consumer groups. When compared with the Consumer group, they did not differ in affective distress. Furthermore, this group did make more use of internal coping and used fewer external strategies and, finally, was characterized by higher levels of satisfaction. This group is more adjusted to a new style of life which may be better for their health. The consumer group that did not receive treatment showed several ways from the Consumer group. Furthermore, this group showed the highest levels of pain distress. We suggest that the idea of acceptance, i.e. acceptance of the problem, may enable a future directed orientation. Acceptance also shows the highest levels of internal orientation and satisfaction. We suggest further that if both groups could manage their problem, then the group that has the highest levels of satisfaction is the Consumer group that has learned to live with their pain.

Chapter Seven and Conclusion: Multidisciplinary treatment represents a specific treatment package of the Multidisciplinary Pain Centre Groningen. The program itself is based on the belief that the goal of this program is to help people to manage their pain effectively. Therefore, the first major study was to assess the effectiveness of the Multidisciplinary Pain Centre Groningen on the population of chronic pain patients in the Netherlands, as found between the PM-group and the Consumer group. The extreme than the difference was found between the Consumer group that has learned to live with their pain and the group rated pain as being less severe, experienced lower levels of pain distress, affective distress and seeking support. Group differences were found between the Consumer group that has learned to live with their pain and the other groups. Although, both groups differed in the duration of pain, this gave no explanation for the group differences. Higher levels of general activity were partly responsible for this group, mainly because of their higher levels of personal distress, being (personally) Distressed Professionals or Frustrating. Clinical experience suggests that this patient profile was the most difficult group to treat. Although, reduction in pain and functional improvement in the Consumer group was reported, an enduring decrease was reported.
ential effects were found in a group that did not receive a treatment and were referred to a specialist. The specificity of the initial treatment effect was determined most strongly by the within-subjects interactions. The no-treatment group showed the highest levels of affective distress.

SUMMARY

Characterized by higher levels of internal orientation. Therefore, we suggest that this group is more adjusted to a pain situation than both other groups. The subjective quality of life may be better for this group than for both the Consumer group and the Non-consumer group that did not learn to live with their pain. The latter group also differed in several ways from the Consumer group, but these differences are less dramatic. Furthermore, this group showed the highest levels of affective distress.

We suggest that the idea of 'having learned to live with pain' reflects a process of acceptance. This acceptance may enable a future directed orientation to life, independent of a possible solution to a pain problem. Acceptance also enables one to take control over of one's life, reflected in higher levels of internal orientation. Although measures of acceptance are lacking, we suggest further that if both subgroups differ in the degree of acceptance of their pain problem, then the group that has learned to live with pain experiences pain beyond patienthood.

Chapter Seven and Chapter Eight present the development and evaluation of a multidisciplinary multicomponent outpatient group treatment for chronic pain. This treatment represents a specific multidisciplinary approach to chronic pain as part of the treatment package of the Multidisciplinary Pain Center of the University Hospital of Groningen. The program itself is comparable to similar approaches elsewhere. The goal of this program is to help and to teach the chronic pain patient to cope with pain more effectively. Therefore, the focus of treatment is adjustment. The aim of this prospective study was to assess the effectiveness of the pain management program (PM) of the Multidisciplinary Pain Center (MPC). The sample of patients (n=44) was drawn from the population of chronic pain patients that were referred to the MPC. Differences were found between the PM-group and the MPC-group, although these differences were less extreme than the differences between the PM-group and the reference group (the Non-consumer group that has learned to live with their pain). The PM-group showed higher levels of pain distress, affective distress, distorted cognition, internal and external coping and seeking support. Groups did not differ in social support. On the other hand the PM-group rated pain as being less severe than both comparison groups. Differences on pain related data and treatment history showed marginal differences. Therefore, we suggest that the pain management group consisted of patients that are less adjusted (in terms of the Stress-response model of chronic pain) to their pain situation, resulting in higher levels of distress, both affective and pain related. On the other hand, this group showed higher levels of general activity. The PM-group also showed higher levels for the Interpersonally Distressed Profile. Social interactions are sought but often experienced as frustrating. Clinical experiences do suggest that low levels of assertiveness, characteristic for this group, may have contributed to this finding. Another characteristic of this patient profile was the above average level of general activity. This finding may be partly, the result of their task as homemaker.

Although, reduction in pain is not a target of the program, a statistically significant and enduring decrease was reported for subjective pain. Given the multidimensional notion of
pain, e.g., the emotional, cognitive and behavioral dimensions, it is not surprising that a program that focus on such components may lead to experienced changes in pain intensity. Changes in pain intensity, however, did not explain the changes in other variables. This implies that a more favorable adjustment to pain is possible, despite the subjective pain experience.

The characteristics of the PM-group suggest that a multidisciplinary approach to their pain problem may be appropriate for these patients because the program focusses both upon psychosocial functioning and physical problems. At a statistical level this suggestion was reinforced. Patients showed improvements after termination of the treatment, improvements that appeared to be stable at follow-up. Follow-up levels showed no regression to the pretreatment levels. Differences with the comparison groups did level down and at follow-up the PM-group differed with the MPC-group only on affective distress. Therefore, the PM-group strongly resembled the reference group and the MPC-group at follow-up.

Both findings, statistically and clinically, do suggest that the pain management program can be seen as an effective program to help or to teach patients to manage their pain problem more effectively. In a short period of time, patients adjusted to their pain situation more effectively and grow to resemble subjects that have learned to live with their pain in a less structured way.

Finally, in Chapter Nine a general and critical discussion is presented based upon the results of the empirical studies. Chronic pain and the stress-response model of chronic pain are embedded within the broader perspective of the International Classification of Impairment, Disability and Handicap. Furthermore, the Stress-response model to chronic pain proved to be fruitful in delineating those variables that are assumed to contribute to and/or to represent adjustment to chronic pain and, hence, can be seen as an enrichment in our perspective on chronic pain and a useful model for research purposes.

Furthermore, we suggest that chronic pain should no no longer be primarily defined in terms of pain duration. Mechanisms that may lead to chronicity may be already present or develop during the early stages of an acute pain experience. This notion is that in an acute pain state, maladaptive emotional, cognitive, behavioral and environmental reactions and/or factors may develop or may be present, which may put a person at risk for developing chronic (intractable) pain. Further research on this topic is needed. Results from these studies may have important consequences for the assessment and treatment of chronic pain. Consequently, such studies may promote the recognition of chronic pain in the 'first line' and may lead to more adequate intervention strategies in 'first line' settings as well as in specialized pain centers. In this way a multidimensional perspective on pain may lead in earlier stages of a patient career to an end of the line.