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mpliance Factors in the Behavioural Treatment of Headache in Children and Adolescents†

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ABSTRACT One hundred sixty-one children between 9 and 17 years of age who had migraine headaches participated in a behaviourally oriented treatment programme. Data were collected on factors related to staying in treatment and adherence to treatment instructions. The results revealed that older children were less likely to drop out during treatment. In addition, children with fewer headaches were more likely to adhere to treatment regimen. Demographic data on the families and personality measures on the migraineurs did not distinguish between those subjects who stayed in the programme or dropped out and those who were good or poor adherents.

RÉSUMÉ Cent soixante et un enfants âgés entre 9 et 17 ans sujets à des migraines ont participé à un programme de traitement béhavioral. Des données furent recueillies concernant des facteurs reliés au fait de demeurer dans le programme et à l'adhérence aux directives du traitement. Les résultats ont révélé que les enfants plus âgés étaient moins portés à abandonner le programme durant le traitement. En plus, les enfants avec moins de migraines étaient plus susceptibles à adhérer aux directives du traitement. Des données démographiques sur les familles et les mesures de personnalité des migraineurs ne permirent pas de distinguer entre les enfants qui persistèrent dans le programme et ceux qui abandonnèrent celui-ci, ni entre ceux qui adhérèrent aux directives du traitement et ceux qui ne le firent pas

Compliance to therapeutic regimens has become an increasingly important issue n health care (Dunbar, 1983; Sackett & Snow, 1979). Research has demonstrated nat patients have a great deal of difficulty in carrying out even simple health care nstructions such as taking a pill once or twice per day (Firestone, 1982; Sackett, 979). In a compliance study of children diagnosed as suffering from streptococcal pharyngitis and acute otitis media, Bergman and Werner (1963) discovered that 56% ad stopped taking the medication by the third day, 71% by the sixth, and 82% by ne ninth day. Similarly, Mattar, Markello, and Jaffe (1975) found that only 7.3% f 300 pediatric outpatients completed their course of antibiotics for otitis media. Overall, it has been estimated that 50% of adults and children do not take medication as prescribed (Briant, 1978; Dunbar, 1983) and thus reduce its effectiveness.

Given the relative ease of taking medication as compared to the more time-consuming and demanding requirements of a psychologically based intervention,

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it is not inconceivable that these therapies are even less adhered to than medication-taking (Firestone, 1982). However, there is a dearth of information in the area of compliance to psychologically based intervention programmes in general, and with children and adolescents in particular. Those studies that have been concerned with pediatric populations have largely dealt with parents' management of their child's health care. Less attention has been directed to the child's own compliance with behaviourally oriented treatment programmes.

In the present study, various factors associated with staying in a behaviourally oriented treatment programme and good or poor adherence to the programme were examined. The subjects were a group of children and adolescents involved in a behaviourally oriented psychological treatment programme for migraine headaches. This programme required a considerable commitment from the children and relatively little input from the parents.

Method

Subjects: One hundred sixty-one children (58 males, 103 females), between 9 and 17 years of age referred by pediatricians, family physicians, and neurologists in the Ottawa-Hull area participated in this investigation. Each child was seen by a neurologist to confirm the diagnosis of migraine according to the diagnostic criteria outlined by the Ad Hoc Committee on Classification of Headaches (1962).

The diagnostic criteria were for intermittent paroxysmal headache and any two of the following four symptoms: throbbing pain, scotomotor or related neurological phenomena, nausea and/or vomiting, and a positive family history. Other inclusion criteria were a minimum headache history of 3 months, an average frequency of once per week, no new prophylactic medication within the previous 2 months, and a minimum IQ of 80 on the Peabody Picture Vocabulary Test. Children with allergic, purely dietary, or menstrual headaches were excluded, as were those with unstable emotional or medical problems likely to require other interventions.

Behavioural Treatment Programmes: The study involved four treatment programmes: a relaxation training group, a cognitive-coping training group, a nonspecific treatment group, and a self-monitoring control group. The trained therapists were required to follow a treatment protocol for each of the groups. A written report by the therapist on the contents of each session ensured compliance with the treatment protocol. All sessions were tape-recorded and spot checks were made by a psychologist on 20% of the sessions to ensure compliance to treatment protocol. Subsequent analyses revealed no differential treatment effects but that all interventions were equally effective (McGrath, Humphreys, Goodman, Keene, Firestone, Jacob, & Cunningham, 1988).

Relaxation training group. Each child in this group received six training sessions for muscle relaxation following the procedure described by Cautela and Groden (1978). Each child was given a 20-min taped version of the relaxation procedure and instructed to practice at home once daily during the next 6 weeks. They were also instructed in differential relaxation and self-cuing relaxation.

Cognitive coping. This programme, called *Thinking Straight*, was developed by the author as a downward extension of Holroyd and Andrasik's (1978) cognitive self-control programme and Bakal's (1982) cognitive-behavioural treatment. It emphasized altering maladaptive thought processes which mediate unpleasant emotions and biochemical concomitants which may precipitate the headache process. The programme used elements of cognitive restructuring, cognitive control of pain, fantasy, simple problem-solving, and stress-inoculation training (Meichenbaum, 1975). Children were taught to monitor their stress reactions on a daily basis, to record and restructure thought processes, and to note the emotional correlates of their cognitive patterns. They were instructed to use the procedures in all stress-provoking situations as well as for the control of headache pain. Personalized cards containing coping statements were prepared for each subject (e.g., "I'm an O.K. kid even if I don't do so well in math," or, "I can cope with this headache; I won't let it get to me.").

Nonspecific treatment group. Each child in this group participated in stress reduction therapy which consisted of the administration (without interpretive feedback) of objective and protective psychological tests. The rationale explained that evidence indicated that many headaches are precipitated by a strong emotional reaction to stress and these tests helped ameliorate these reactions.

Self-monitoring control group. Each child in this group was informed that there would be a slight delay in starting treatment and was told that self-monitoring alone frequently caused reduction in headaches. Instructions on helping the child understand and control the course of their headaches was presented. The child was contacted by telephone once per week for 6 weeks.

Rating Scales: Headache diary. The headache diary required that the child record headaches four times a day and rate the intensity of each headache on a scale of zero to five, with zero being no headaches, one being the least intense, and five the most intense. From this data a weekly headache index was calculated as the sum of the intensity ratings over the 28 time periods. Previous research has shown that this headache diary is a valid and reliable measure of headache activity (Richardson, McGrath, Cunningham, & Humphreys, 1983).

Anxiety. The State-Trait Anxiety Inventory and the State-Trait Anxiety Inventory for Children (Speilberger, 1973; Speilberger, Gorush, & Lushene, 1970) were used to measure both state anxiety and trait anxiety. The adult version was used for subjects of high school age, and the children's version was used for younger subjects. Children responded to each question on the state anxiety scales according to how they felt in a specified stressful situation. The trait scales asked children to respond according to how they generally feel. Both scales have good internal reliability and appropriate test-retest reliability (Speilberger et al., 1970).

Depression. The Children's Depression Rating Scale (Poznanski, Cook, & Carrol, 1979) and the Self-Report Depressive Rating Scale (Birleson, 1978) were both used to rate depression. The Children's Depression Rating Scale, based on the Hamilton Depression Rating Scale (Hamilton, 1960), is rated by the therapist according to the child's and the parent's answers to the questions. Interrater reliability is .92, and the criterion validity of the scale has been assessed by showing excellent separation of scores by depressed versus nondepressed children.

The Self-Report Depressive Rating Scale (Birleson, 1978) was designed as a measure of depression that is easily completed by the child. Birleson reported high internal consistency as evidenced by a split-half correlation coefficient of .82. There was also some evidence of validity on the grounds that the scale discriminated between the depressed study group and the nondepressed group.

Credibility ratings. Children were asked to rate the credibility of their treatment immediately following the first session and again following the last treatment session with questions such as: (a) How logical does this type of treatment seem to you? (b) How confident would you be that this treatment would be successful in reducing headaches? (c) How confident would you be in recommending this treatment to someone who has headaches? and (d) How confident would you be that children could learn this technique? This approach is more comprehensive than that frequently used (Kirsch, Tennen, Wickless, Saccone, & Cody, 1983).

Demographic data. Information such as IQ, sex, number of siblings, father and mother's education, family situation, and place of residence was collected on the families of the study subjects.

Procedure: The regimen for the headache project required that all children rate their headaches by filling out a diary four times a day. During a 4-week period, prior to treatment, a mean weekly headache index was calculated by summing the intensity ratings of the headaches to establish a baseline. If subjects had headache ratings of two or more on 4 different days, they were randomly assigned to one of four behavioural treatment programmes.[1] These included progressive relaxation, cognitive coping, self-monitoring, and nonspecific control treatment programmes. Treatment consisted of six 1-hr weekly sessions. Children were seen for follow-up sessions 1 month and 3 months after treatment. At this time headache diaries were kept for

[1]Treatment manuals are available from Dr. Pat McGrath, Children's Hospital of Eastern Ontario, 401 Smyth Road, Ottawa, ON, Canada K1H 8L1.

4 weeks, and the baseline assessment procedures for the anxiety and depression measures were repeated.

Therapists rated each child's adherence to the programme regimen after the 3-month follow-up by indicating whether they completed the intensity ratings, the symptoms, the medication, and the possible cause categories on the diaries. Adherence was rated on a scale of never (between 0 and 24% of the time), sometimes (between 25 and 79% of the time), and often (between 80 and 100% of the time). Ratings for homework assignments were also provided by the therapist based on the above scale. These adherence ratings were obtained for the baseline, treatment, 1-month follow-up, and 3-month follow-up time periods.

Children were considered adherent only if they completed the headache intensity ratings often (80–100% of the time) during baseline, treatment, 1-month follow-up, and 3-month follow-up. They also had to complete homework assignments during treatment 80–100% of the time. Children fell into the nonadherent category if they obtained a rating of never or sometimes for the headache intensity rating during any period of the programme.

Children who dropped out before the end of the project were classified as adherent or nonadherent based on the above ratings for the period of time they actively participated. Data on all the variables was not available for each subject, but the amount of data missing was negligible.

Data Analysis: Data analyses comparing adherents versus nonadherents and those who dropped out versus nondrop-out subjects were conducted with the use of chi-square analyses for discrete variables and *t* tests for continuous variables. In addition, analyses of variance were used to analyse variables measured at the three assessment periods: baseline, 1-month follow-up, and 3-month follow-up. Alpha levels were adjusted for each set of analyses to control for multiple comparisons by multiplying alpha by the number of comparisons.

Results

Drop-Outs: A total of 58 males and 103 females (mean age 12.8 ± 2.46, mean IQ 107 ± 16.3) who were seen by the Department of Neurology and who subsequently met the inclusion criteria began baseline. Of these, 30 dropped out prior to treatment. Twenty-five others started treatment but dropped out during the treatment programme or prior to the 1-month follow-up. Only 12 of the subjects who completed the 1-month follow-up dropped out before the 3-month follow-up. This does not include subjects in the self-monitoring group because the programme ended for this group at the 1-month follow-up. Therefore, the total number of subjects available at the 3-month follow-up was 54. It should be noted that there was no difference in drop-out rate between males and females in any of the analyses.

Data analyses of variables including parent's education, the family situation, two-parent families versus single-parent families, the number of siblings, and the family place of residence showed no significant differences between the groups. Furthermore, as indicated in Table 1, there were no differences between the children in the groups except on the Baseline Headache Index. This analysis revealed that those subjects who dropped out before treatment began had significantly lower headache scores as compared with those who started treatment, $t(154) = 4.15, p < .05$.

Subjects who dropped out during baseline or the treatment phase were compared with subjects who completed the 1-month follow-up. There was a significant age difference between the two groups, $t(159) = 2.28, p < .05$, indicating that older children (13.1 ± 2.3 yrs) completed the treatment programme more often than the younger children (12.2 ± 2.4 yrs). There were no significant differences between the two groups on IQ, sex, baseline Headache Index, or anxiety and depression ratings at baseline.

TABLE 1
Comparisons Between Drop-Outs and Treated Subjects

	Drop-Outs			Treated Subjects		
	n	*M*	*SD*	*n*	*M*	*SD*
Demographic Data						
IQ	20	101.2	16.2	124	108.0	16.4
Age	30	12.1	29.6	131	13.0	28.2
Sex						
Male	13 (8.1%)			45 (28.0%)		
Female	17 (10.6%)			86 (53.4%)		
Headache Index						
Baseline	25	8.1	8.8	131	28.0	23.4*

*$p < .05$.

TABLE 2
Comparisons Between Good and Poor Adherents

	Good Adherents			Poor Adherents		
	n	*M*	*SD*	*n*	*M*	*SD*
Demographic Data						
IQ	76	108.0	17.7	68	105.8	15.0
Age	84	12.9	28.3	77	12.8	29.2
Sex						
Male	36 (22.4%)			22 (13.7%)		
Female	48 (29.8%)			55 (34.2%)		
Headache Index						
Baseline	84	18.9	18.5	72	31.4	23.7*
Baseline Anxiety						
State	77	67.2	8.4	68	68.1	5.5
Trait	77	50.6	9.6	68	50.3	9.8
Baseline Depression						
Birleson	76	10.8	4.3	68	10.5	4.2
Poznanski	79	20.8	4.5	67	21.9	4.7

*$p < .05$.

Analyses of variance of pretreatment and posttreatment credibility ratings for drop-outs at the 1-month follow-up versus those who completed the 3-month follow-up indicated a significant difference between groups, $F(1, 130) = 64.14, p < .05$. The drop-outs had lower credibility ratings at both measurement periods (pre = 13.47 vs. 24.64, post = 15.43 vs. 28.62). In addition, credibility ratings increased significantly over time for both groups, $F(1, 130) = 12.47, p < .05$.

Adherence: Comparisons between subjects rated as good adherents and those rated as poor adherents are summarized in Table 2. There were no significant differences between the two groups on IQ, age, sex, and baseline anxiety and depression ratings.

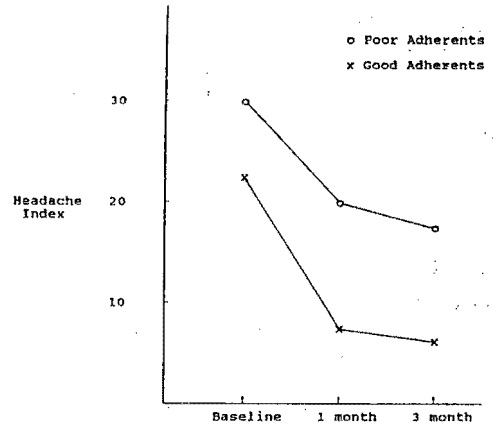

Figure 1. Headache index for good adherent and poor adherent subjects who completed 3-month follow-up.

However, the baseline Headache Index differed significantly between the two groups. Adherents had a lower baseline Headache Index than nonadherents, $t(154) = 3.52$, $p < .05$.

Headache Index and anxiety and depression scores were evaluated at each of the baseline, 1-month follow-up, and 3-month follow-up for all subjects who completed the treatment programme (Fig. 1). A repeated-measures analysis of variance yielded no significant differences over time between the good adherent and poor adherent groups on the anxiety and depression scores. A significant difference was found between adherent groups on the Headache Index, $F(1, 53) = 5.62$, $p < .05$, with the poor adherents showing a greater Headache Index than the good adherents. There was also a significant improvement over time on the Headache Index for both groups, $F(2, 106) = 21.43$, $p < .05$.

Discussion

The factors which were found to be significantly related to compliance in this study were the initial severity of the problem (the baseline Headache Index), age, and the child's perception of the treatment rationale (credibility rating). The fact that older children were more likely to stay in the programme than younger children may have been related to parental involvement in this study. Parental involvement was necessary with the younger children, in terms of keeping appointments and reminders to keep the headache diaries, and this may have contributed to their dropping out. Older children were more autonomous in their required activities. They were more likely to schedule their own appointments, come to meetings on their own, and accepted more responsibility for completing headache diaries and homework assignments. Both Dunbar (1983) and Haynes (1979) have reported that age has been associated with compliance, but the relationship has not been consistent across studies.

The initial severity of the child's headache problem, as recorded in the headache diary during the 4 weeks of the baseline period, was significantly related to whether children dropped out during baseline, and to whether they were good or poor adherents to the treatment programme. Children who dropped out during baseline had a lower Headache Index than those who remained in the programme. The drop-outs may have chosen not to continue because the involvement was too demanding in relation to the amount of pain they were experiencing. Also, infrequent headaches have made it more difficult to remember to complete the headache diaries and come to appointments.

For children who remained in the programme, Headache Index was an important factor in determining who was adherent and who was nonadherent. Children with more severe headaches were less likely to follow instructions, such as doing homework assignments and completing diaries, during the course of treatment than children with less severe headaches. For these children headache-free periods were less frequent, and during this free time they may have chosen to direct their attention away from headache-related issues. They reported that they wanted to do other things in their headache-free time, such as school work or social activities rather than headache-related assignments such as practicing the treatment techniques or completing diaries. In addition, the children with the more severe headaches may have chosen not to complete their diaries or do homework assignments because they were not feeling well most of the time. It may be that children with very bad headaches need to experience a great deal of change in their headaches in order to feel better; otherwise, they become discouraged and decrease their full participation in the treatment programme.

This finding is contrary to the notion that patients with more severe symptoms would be more likely to adhere to a treatment compliance; rather, more symptoms affected compliance in a negative direction. Haynes (1979) reported this finding in such problems as rheumatoid arthritis and anxiety neurosis with adults and otitis media and pharyngitis in children.

Treatment credibility ratings increased between the pretesting and posttesting for all subjects. The pre- and posttreatment credibility ratings for children who completed the 3-month follow-up were significantly greater than the credibility ratings of children who dropped out after the 1-month follow-up. Children who thought the treatment less credible did not bother to carry it through. Treatment credibility ratings have not been reported in the literature as a determinant of compliance.

Generally, compliance in pediatrics has been dealt with by looking at parent's compliance to the recommended child's regimen. However, in some studies it is difficult to determine whether parent or child compliance is being measured (Dunbar, 1983). An important aspect of the present study was to shift the focus of compliance research in pediatrics from measuring parent compliance in children to measuring the child's own compliance to a treatment regimen.

In this study, the important child or adolescent compliance factors were initial headache severity, age, and credibility ratings. The fact that parental compliance was not examined limits the possibility of comparisons to other findings in the literature. The other unique feature of this study was its concern with compliance to a behavioural regimen rather than to a medical regimen such as pill-taking or prescription-filling. Thus, further investigations with children and adolescents and their adherence to psychologically based intervention programmes are required before firm conclusions can be rendered.

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