

CHAPTER FOUR: THOUGHTS AND EMOTIONS

The close link between vertigo and anxiety has been recognised for many years; indeed, one of the earliest definitions of agoraphobia explicitly attributed the aetiology of the syndrome to vestibular dysfunction. Numerous cross-sectional studies have documented an association between recurrent vertigo and emotional disturbance, whether assessed by questionnaire, case-study or by diagnostic interview (e.g. Eagger et al., 1991; Hinchcliffe, 1967; Lilienfeld et al., 1989; McKenna et al., 1991). Explanations for the association between vertigo and distress have tended to be dichotomised into two principal hypothesised mechanisms; somatopsychic or psychosomatic.

No clinician would deny that psychological problems can be caused by vertigo (somatopsychic causation). Pratt and McKenzie (1958) recorded twelve instances of patients who developed various forms of psychological disturbance apparently as a direct consequence of a vestibular dysfunction; panic attacks, fear of travelling and depression were the most common sequelae. In ten of the twelve patients treatment and explanation of their medical condition resulted in recovery or significant improvement. Three of these patients had received extensive psychiatric treatment before the organic basis for their anxieties was recognised, and Pratt and McKenzie note that if no objective evidence of vestibular dysfunction is present when patients are examined there is a risk that the dizzy patient may simply be regarded as anxious or neurotic. Indeed, Marks (1981) coined the term "space phobia" to describe the condition of a subgroup of patients referred for treatment for agoraphobia who, on investigation, had balance system disorders initially dismissed as insufficient to explain their anxiety; he suggested that in these patients an organic instability might be the primary cause of their fear of open spaces and falling. There are obvious similarities between this "space phobia" and the development of what Levy and O'Leary (1947) have called "street neurosis", a fear of going out (especially alone) which can develop following recurrent attacks of vertigo, which many of those interviewed in my studies readily admitted to:

I lose my confidence about going out -- it's the thought of going out and one of the attacks coming on. You tend not to do things in case something happens ... you tend to wait until somebody can go [out] with you.

I got to the stage where I was scared to do anything; I was frightened to go out, because I didn't know how I was going to be, I was frightened to get up and do anything.

Although the somatopsychic effects of vertigo are widely acknowledged, in the research literature more attention and energy appears to have been devoted to exploring the psychosomatic perspective; in particular, the idea that personality traits and/or stress may predispose the individual either to vertigo itself, or to complain of vertigo. The hypothesis that certain personality types are particularly vulnerable to vertigo has been most extensively investigated in the context of Ménière's disease. The evidence in support of a supposed psychosomatic contribution to the disorder consists mainly of studies showing that groups of Ménière's patients have higher average scores on scales measuring

such personality traits as neuroticism, anxiety and hypochondriasis than do control groups, either composed of healthy individuals or of patients with other complaints assumed to be of equivalent severity (for a review, see Jakes, 1987). However, Crary and Wexler (1977) point out in an excellent critique of the early literature that most of these studies failed to employ an adequate control group, and that those that did properly control for the symptom of vertigo found no significant inter-group differences.

In an exceptionally large and thorough study of the association between vertigo and anxiety, Crary & Wexler themselves assessed personality traits and symptoms of vertigo in patients with Ménière's disease, a non-vertiginous control group of patients with hearing loss, and a vertiginous control group comprising people whose vertigo was caused by conditions not suspected of psychosomatic causation, such as vertigo related to middle ear disorders, postural provocation, cervical disorder or acoustic neuroma. A battery of scales was administered, including the Minnesota Multiphasic Personality Inventory (MMPI) and various measures of anxiety, stress, and self-esteem. Compared to the non-vertiginous controls, both vertiginous groups had elevated mean scores on some scales, particularly the depression, hypochondriasis and hysteria scales of the MMPI. However, there were no systematic significant differences between the scores of the Ménière's disease group and those of patients with vertigo due to other medical conditions. Crary and Wexler concluded that the psychological distress noted in Ménière's disease patients was also a concomitant of a wide variety of forms of vertigo, and was therefore probably of somatopsychic origin.

A fundamental problem besetting attempts to resolve the debate as to the putative role of psychosomatic factors in Ménière's disease has centred on the difficulty of selecting an appropriate control group for comparison with Ménière's patients. To allow for the possibility that the somatopsychic effects of vertigo may influence scores on scales measuring psychological status, the psychological profile of people with Ménière's disease has been compared with that of people with other disorders, or with different forms of vertigo. For example, Stephens (1975) found that Ménière's patients had significantly higher scores on the "obsessionality" and "depression" scales of Crown and Crisp's Middlesex Hospital Questionnaire than did patients with "idiopathic peripheral vertigo". Unfortunately, the precise nature of the vertigo experienced by this latter group was not described. In contrast, when Brightwell and Abramson (1975) compared a group of Ménière's patients with vertiginous controls they found no intergroup differences in scores on the Eysenck Personality Inventory or the Cornell Medical Index. This was despite the finding that, as in Crary and Wexler's study, the vertigo in the Ménière's group appeared more severe and handicapping than in the non-Ménière's group according to a range of self-rating measures (frequency of attacks, time since last major attack, day's work missed etc.). In order to completely cancel out the effects of somatopsychic processes, controls should be matched on all potentially relevant factors, including the severity and frequency of vertigo, associated symptoms such as hearing loss, and the overall duration of a history of dizziness. In practice, this degree of matching is almost impossible to achieve, since Ménière's disease is normally diagnosed largely on the basis of symptomatology, and therefore precise matching by symptoms tends to yield a control group which may itself contain many individuals with suspected Ménière's disorder (Hinchcliffe, 1983).

Several studies comparing groups of people with vertigo of mixed aetiology with non-vertiginous controls have also failed to uncover any substantial differences on scales assessing personality or general emotional disturbance (Skovronsky et al., 1981). Where reliable relationships between vertigo and abnormal scale scores are established, these are usually based on a correlation between reported dizziness and somatic and phobic anxiety (Hallam & Stephens et al., 1985; Rigatelli et al., 1984; Skovronsky et al., 1981). However, interpretation of these correlations is complicated by the risk of "criterion confusion" created by the item content of the scales used to assess somatic and phobic anxiety. Measures of somatic anxiety almost invariably include items assessing symptoms such as dizziness and nausea, which even the least anxious vertiginous patients are bound to endorse, while scales assessing "phobia" are not designed to take into account the possibility that the respondent may have quite rational grounds for avoiding certain situations and activities (see previous chapter). Consequently, an artifactual relationship between vertigo and somatic anxiety and phobia may be found when people with vertigo but little anxiety nevertheless truthfully report that they often feel disorientated, avoid heights and travel as far as possible, and experience attacks of cold sweating. Similarly, people with vertigo due to vestibular disorder may well report unexpected, terrifying attacks which include symptoms such as dizziness or unsteadiness, nausea, trembling, and sweating, yet these very same symptoms meet the strict psychiatric (DSM-III-R) criteria for a diagnosis of panic disorder if "it cannot be established that an organic factor initiated and maintained the disturbance". The proviso that evidence of organic dysfunction is needed to exclude a diagnosis of panic disorder therefore assigns a critical differential diagnostic significance to tests of the balance system, but these can provide only an insensitive and unreliable appraisal of balance system function (see Chapters 1 and 2).

The hypotheses and arguments concerning the nature of the association between vertigo and anxiety that are rehearsed in the research literature are also deliberated by people suffering from vertigo. The strong psychosomatic position, that complaints of vertigo are signs of underlying psychological disorder, are usually anxiously refuted (see Chapter 2), and many sufferers espouse a clearly somatopsychic perspective:

You almost experience, as I say, a personality change. You become very insular and very introspective ... it was everything, total under-confidence, you just don't feel like doing anything, you just want to curl up and crawl away and forget about it.

However, others are sympathetic to the idea that personality might affect the impact of vertigo:

I think if you were the timorous type or the agoraphobic type it would be very easy to get yourself in a state where you wouldn't do things, in case.

This interactionist position, whereby psychological factors are portrayed as influencing responses to vertigo of organic origin, offers a possible explanation for the relatively high incidence of previous psychiatric problems observed in

vestibular patients referred to specialist neuro-otological clinics (Eagger et al., 1992; McKenna et al., 1991); whereas the vertigo of these patients may be quite unrelated to psychological factors, the people who are eventually referred for expert help may be predominantly those who are more liable to become anxious or who have poor coping skills. There is also some evidence that the complaints of mild dizziness or imbalance which can be elicited from people who have not sought medical assistance on account of vertigo may be influenced by personality or emotional factors (Hallam & Stephens, 1985). This was demonstrated in an ingenious study (Stephens et al., 1991) in which a community sample were asked whether they had any problems with hearing or dizziness. There was a tendency for those who admitted to dizziness to also complain of hearing difficulties, yet objective assessments indicated that their hearing was no worse than that of people who denied any hearing or balance problems. This suggests that their complaints of dizziness may also have been exaggerated.

Some investigators have attempted to establish whether personality also contributes to the more severe vertigo seen in hospital out-patients by asking them about their psychiatric history prior to the onset of the vertigo (Eagger et al., 1991). The difficulty with this approach is that persistent vertigo may result in a "retrospective reporting bias", whereby patients who are currently distressed because of vertigo may selectively remember episodes of stress and anxiety preceding the onset of vertigo, and erroneously perceive and describe themselves as having always been abnormally anxious. The way in which anxiety and depression can influence memory and self-image has been well documented in psychiatric patients. Moreover, Coker et al. (1989) have obtained evidence indicating that current symptomatology influences dizzy patients' self-reports of their personality characteristics. They administered the Minnesota Multiphasic Personality Inventory to people with Meniere's disease, and noted that only those who had experienced symptoms within the previous three months had markedly elevated scores; the scores of Meniere's patients who were in remission were not significantly higher than a control group of non-vertiginous medical patients.

The hypothesis that stress, rather than personality, may trigger attacks of vertigo is also widely entertained, and is often transmitted to patients (see Chapter 1). After conscientious introspection, many people with vertigo nevertheless feel obliged to reject this suggestion:

I know I don't get it with worry, because when I am worried about anything I don't get any attacks. When I know I am terribly worried about anything, I don't actually get an attack at that time.

However, it is interesting to note the variety of responses to a questionnaire survey of people with Meniere's disease (Austin, 1992), in which respondents were explicitly requested to list "Stress factors that make your condition worse (emotional/physical)". Despite the strong implicit suggestion conveyed by this heading that stress was likely to be a contributory factor, several people nevertheless denied any link between their vertigo and stress, writing:

"Stress factors do not appear to make condition worse -- when obvious stress happens -- no vertigo!"

"Possibly an additional factor -- but I cannot honestly say I have noticed any special correlation beyond over-exertion, or just plain end of day fatigue." (Austin, 1992, Appendix 10)

On the other hand, many people wholeheartedly agreed with the proposition that stress was an aggravating factor, commenting that:

"Stressful job makes it [vertigo] worse".

"Stress or being over anxious main factor. Tiredness, overdoing things."

"Stress is my biggest problem. Sudden emotional shocks, i.e. friends or relatives dying. If I work a lot of overtime then I run the risk of bad attacks."

"Stress, I'm sure, does make some difference. If I worry a lot over something (unfortunately I usually do) I definitely don't think it helps. Getting tired isn't good either especially for my tinnitus."

Stress is a problematic concept, which can be defined solely in terms of physical or psychological threats or changes caused by external events, but may also be considered to embrace the individual's reactions to environmental conditions. From their replies, it is clear that several different definitions of "stress" may have been employed by respondents; some people emphasise environment and life events (occupational demands, traumatic negative events) whereas others note the contribution of personality and appraisal (e.g. tendency to worry). In addition, the reported stresses very often confounded emotion, exertion and fatigue, and therefore the possible independent effects on vertigo of physiological arousal and excessive demands on information processing capacity (see following sections) unfortunately cannot be distinguished.

The answers of some respondents suggest that awareness of the psychosomatic hypothesis may have led them to search for confirmation of a causal link between anxiety and dizziness, despite the lack of any obvious association:

"I feel stress can be a factor in triggering off an attack but probably comes in a subtle and delayed way, not necessarily immediately."

"Anxiety sometimes seems to make the condition worse, but this is far from predictable."

The possibility that knowledge of the hypothesised contribution of stress to vertigo may motivate deliberate efforts to discover evidence for psychosomatic causation complicates the interpretation of research into this topic, since this increases the likelihood that occasions of coincident vertigo and stress will be selectively attended to, remembered and reported. Research into the association between stress and vertigo is consequently susceptible to problems of biased

reporting similar to those which have plagued studies of personality and vertigo. In order to avoid the problems of inappropriate control groups and retrospective reporting bias, a strong test of the hypothesis that stress causes, exacerbates or triggers vertigo therefore ideally requires a prospective longitudinal design.

The study of Crary & Wexler (1977) is the only investigation which has examined prospectively whether direct links between specific occurrences of stress and vertigo can be observed. Participants in this study who suffered from Ménière's disease were asked to keep a daily record of the incidence of stressful events and vertigo. Over three-quarters of the days with vertigo occurred in the absence of any reported stress, either during, or for five days preceding or following the vertigo. The incidence of stress in the absence of vertigo is difficult to gauge from the reported data. However, the proportion of days in which stress neither preceded nor followed vertigo seems remarkably low, indicating that the relative incidence of reported vertigo (compared with reported stress) may have been so high as to preclude sufficient isolation of the effects of episodes of vertigo and stress. The incidence of stressful events was slightly lower before than on, or after, days with vertigo; unfortunately, it is not possible to tell whether stress occurring on the same day as vertigo preceded or resulted from the dizziness. Finally, within-subject comparisons revealed no difference in state (i.e. current) anxiety scores at the start or end of a month free from vertigo or a month in which vertigo occurred, although the occurrence of vertigo did significantly affect patients' perceptions of whether their illness was improving (recorded at the end of the month).

In conclusion, Crary and Wexler's wide-ranging and conscientious study did not provide any clear indication that stress or anxiety can trigger vertigo. Nevertheless, the hypothesis of an immediate causal role for stress cannot be absolutely refuted on the basis of these results, partly because of the limitations of this single study, detailed above, and also because failure to prove the experimental hypothesis cannot be taken as confirmation of the null hypothesis (that stress does not cause vertigo). In addition, a basic shortcoming of the majority of investigations into the possible contribution of psychological factors to vertigo is that they have simply attempted to document an association, rather than attempting to understand the processes and mechanisms which might mediate this relationship. The following sections therefore consider in more detail the complex ways in which vertigo, anxiety and stress may be inter-related.

Immediate fears, associations and arousal

A sense of confusion, fear and incapacity is a recurrent theme in almost all descriptions of an acute attack of vertigo; indeed, fear appears to be an immediate, unthinking component of the experience itself. This may be partly because vertigo entails not only extremely unpleasant sensations of nausea and malaise, but also loss of control over the body, a form of helplessness which seems to be particularly strongly related to the development of anxiety and depression (Mineka & Kelly, 1989). Certainly, in their explanations for the dread induced by vertigo, many people identify the incapacity and powerlessness associated with severe malaise as the most aversive aspect of an attack:

I worry more about the attacks coming on than not being able to hear, yes, because that doesn't hurt me -- the sickness and the

illness does. I can accept being deaf, and the noises in my head, but what is really bad is feeling so dreadfully ill and helpless.

I was terribly frightened, because I was completely out of control, there was nothing I could do about it. I just hate being sick, and I'm very, very rarely sick; I think, apart from the Meniere's, only perhaps once in my life, so it's frightening.

It's just the anticipation of that, that's worst, and knowing that there's nothing you can do about it, that you weren't going to feel very well at the end of it -- not life-threatening, but you were going to feel very, very ill and you were going to be two or three days, certainly twenty-four hours that you were just incapacitated.

Vertigo disrupts the relationship between self and environment at the most fundamental level, and thereby undermines the very basis for meaningful experience; as Giorgi puts it, "all experiences are double-grounded -- on the side of the world and on the side of the body ... the crux of the matter is that the body [in active relation to the world] is the taken-for-granted ground of every experience we have" (1977, p. 96). Rigatelli and co-workers point out that the "precariousness of the self" induced by vertigo is such that vertigo has been employed frequently in literature and philosophy as a symbol and metaphor for existential anxiety and confusion (Rigatelli et al., 1984). Indeed, some people find the experience so terrifying that they feel their very existence is threatened:

In a really bad attack I don't really know if I'm going to come round from it, you feel, you know, "Am I going to die?" -- you feel that bad.

When these attacks do come on they are frightening because you do feel so absolutely horrible ... I felt ever so bad about it 'cause I was just stopped by the side of the road, and I was just sick, I couldn't help it -- it did bother me. It's a bit frightening when you're on your own and you feel like this, and you don't really know what to -- well, you can't do anything. I thought I was going to die, well, I at one time thought it was going to get me in the end, but I don't think it's that sort of thing, and anyway we've all got to go some time -- but it's not a pleasant thought, is it?

Of course, many illnesses evoke fear, whether of discomfort, physical decay and disability, or death. However, such fears are generally the result of conscious, and often rational and realistic, appraisals concerning the possible future consequences of disease. In the case of acute vertigo, terror often seems to be an almost automatic, instantaneous reaction, occurring at what some psychologists would consider to be the pre-attentive or pre-conscious stage of information-processing which mediates the formation of basic associations between events and emotions (as in classical conditioning). An interesting, although hitherto untested, possibility is that disorientation may be one of the elemental dangers to which humans have been attuned by evolution, in the same

way that we appear to be particularly prone to detect and fear spiders and snakes. It is also conceivable that personality factors might operate at this stage to influence reactions to disorientation, since there is evidence to suggest that pre-conscious awareness and processing of possible threats is enhanced in anxious or emotionally reactive people and animals (Eysenck, 1991). Brandt has suggested that a predisposition to anxiety may play a significant role in the development of visual vertigo, claiming that:

"Neurotic acrophobia results when physiological [i.e. environmentally provoked] height vertigo induces a conditioned phobic reaction which is characterised by a dissociation between the objective and subjective risk of falling ... Phobic vertigo syndromes require both neurotic structure of personality as well as the eliciting stimulus situation, which is often uncomfortable even for healthy subjects. Consequently, impairment of postural balance, due to ataxia or the deficiency of any one of the stabilizing sensory systems, may facilitate the induction of acrophobia or agoraphobia in predisposed subjects." (Brandt, 1984, p. 452).

Thus, while Brandt recognises that people with orientation system deficiencies are more vulnerable to "physiological visual vertigo" than are healthy people, he nevertheless insists that only those with a predisposition to conditioned fear reactions will subsequently develop a dread of disorienting situations. In his review of the relationship between panic disorder and the vestibular system, Jacob (1988) also takes the view that vulnerability to disorientation due to vestibular dysfunction is not a sufficient cause for fear and avoidance of eliciting situations, although he terms secondary fear of disorienting situations a "pseudoagoraphobia", and is more tentative in attributing it to "... some other variable, perhaps personality factors related to anxiety proneness [which] constitute a moderating influence on the somatopsychic effects of vestibular dysfunction." (Jacob, 1988, p. 366). Nevertheless, there are many situational factors attached to visual vertigo which could provide an equally adequate explanation of the development of fear and avoidance of disorienting situations without recourse to supposedly neurotic personality traits (see following section).

Jacob also outlines a (purely hypothetical) model of conditioned responding which might partly explain visual vertigo in people who have one or more acute attacks of vertigo of vestibular origin at some time. He proposes that the intense fear associated with disorientation caused by a vestibular disorder may become conditioned to more mildly disorienting situations. In other words, having experienced the terror of a true vestibular attack, the individual may find that the first signs of disorientation -- even if now due to disorienting environmental conditions -- are enough to automatically trigger severe anxiety. Of course, this pre-conscious activation of anxiety may also be reinforced by conscious fears of the onset of an acute attack if the individual is unaware of the environmental cause of their disorientation (see Chapter 3).

A further possibility is that some form of classical conditioning of the autonomic symptoms associated with disorientation may also occur. Interestingly, Morrow et al. (1991) have found that the incidence of (conditioned) vomiting in anticipation of chemotherapy is related to motion

sickness susceptibility, and suggest that a "preparedness for associative learning" may mediate both. The possibility of some form of conditioned responding, akin to learned taste aversion, seems particularly plausible in view of the hypothesised evolutionary function of vertigo as a response to ingestion of poisonous substances (Triesman, 1977). This might partly explain why motion sickness is often wrongly attributed by sufferers to the effects of fumes from food, petrol or tobacco (Lawther & Griffin, 1988). However, Challis & Stam (1992) have questioned the evidence for an association between motion sickness susceptibility and conditioned nausea, claiming instead that awareness of somatic symptoms of anxiety arousal is one of the foremost psychological predictors of anticipatory nausea and vomiting. In a recent longitudinal study of hospital outpatients diagnosed as suffering from balance system dysfunction, the reported frequency and severity of somatic anxiety-related symptoms was also shown to predict reported change in vertigo severity and handicap (Yardley, 1993; Yardley, Luxon & Haacke, 1993). The way in which somatic anxiety and autonomic arousal may influence reactions to vertigo therefore deserves more detailed consideration.

Physical symptoms characteristic of somatic anxiety include sweating, muscle tension, heart pounding or racing, disorientation or dizziness, trembling, and, in extreme cases, urge to urinate or defecate and nausea (e.g. Crown & Crisp, 1979; Derogatis et al., 1974; Schwartz et al., 1978). Since all of these (except urge to urinate) have also been described as part of the symptomatology of vertigo or motion sickness (Graybiel, 1969; Morrison, 1984; O'Connor et al., 1988), it is very difficult to determine, either in general or in the case of a particular individual, to what extent the autonomic symptoms associated with vertigo are directly triggered by disorientation or reflect the existential anxiety that also forms an integral part of the syndrome. However, statistical techniques can be employed to identify clusters of inter-related symptoms, and to determine how these symptom clusters relate to anxiety and handicap. Analysis of the responses of patients with diagnosed vestibular disorders to a questionnaire (the Vertigo Symptom Scale) assessing a wide variety of symptoms commonly associated with vertigo revealed four clusters of symptoms (Yardley, Masson et al., 1992). Unsurprisingly, one of these symptom clusters related to prolonged vertigo, together with postural instability, nausea and vomiting, while a second cluster described more mild, transient sensations of disorientation; these symptom clusters were not correlated with any measure of anxiety. However, two additional anxiety-related clusters of symptoms could be distinguished, the first comprising symptoms which are consistent with anxiety arousal, and possibly hyperventilation (e.g. heart pounding, sweating, feeling faint or short of breath). The second cluster contained a wide diversity of symptoms (e.g. back pain, chest pain, difficulty concentrating), many of which were derived from pre-existing scales measuring "somatisation"; high scores on the sub-scale created from these items would therefore suggest over-reporting due to excessive attention to physical status, emotional distress, or general concern about health. A follow-up of the patients who originally completed the Vertigo Symptom Scale showed that the self-report measures of autonomic symptoms and somatisation were the best longitudinal predictors of subjective wellbeing and change in handicap (Yardley, 1993a,b; Yardley, Luxon & Haacke, 1993). These symptoms predicted change in vertigo severity over the seven month period better than any of the other variables assessed, including age, gender, diagnostic

classification, vertigo severity or duration, audiovestibular test results, or medication use.

There are several ways in which somatic anxiety and autonomic symptoms could contribute to perceived vertigo severity and handicap. High scores on the self-report measures of symptom frequency might simply indicate an excessive awareness and fear of physical symptoms. It has been suggested that the tendency to focus upon oneself is inevitably associated with distress and handicap, either because anxious self-monitoring of one's physical status is itself a sign of underlying psychological difficulties, or because constant self-evaluation draws attention to somatic and psychological states which could be interpreted negatively, and which might otherwise have been overlooked (Bass, 1990; Schwarzer & Wicklund, 1991). Hence, sensitivity to vertigo could be enhanced by an internal focus of attention, or by a predisposition to evaluate sensations and events as potentially threatening, or to detect and monitor perceived sources of threat (Cioffi, 1991; Eysenck, 1987; Ingram, 1990; Miller, 1990; Watson & Pennebaker, 1989; Williams et al., 1988). However, although most theories of the relationship between anxiety and preoccupation with physical symptoms characterise an inward attentional focus as an anxiety-related personality trait, several of the accounts given by people with vertigo in this book indicate that they felt that their illness made them unusually introspective.

An interactional model of the relationship between anxiety and symptom perception has been proposed by Clark (1986) to explain the development of panic; he suggests that negative perceptions of the physiological signs of arousal can themselves give rise to heightened anxiety, leading to an escalating cycle of symptoms and fear of what they might signify (Clark, 1986). For example, temporary increases in heart rate which are actually within the normal range may be interpreted as an indication of severe illness or inability to cope, resulting in further anxiety and increases in heart rate (Pauli et al., 1991). In addition, many people who experience panic attacks also develop agoraphobia, as they learn to avoid situations in which they fear they might panic. In the case of vertiginous patients, autonomic symptoms may originally form part of the syndrome of spontaneous acute vertigo, but might thereafter become part of a panic reaction to the milder disorientation provoked by movement, disorienting situations, or perhaps fatigue and stress.

Alternatively, or additionally, the high somatic anxiety and autonomic symptom scores might reflect genuine physiological arousal, or even hyperventilation (overbreathing). Arousal and hyperventilation may directly enhance disorientation via the numerous reciprocal connections between the vestibular system, cerebellum and autonomic brainstem structures (Jacob, Furman, Clark, Durrant & Balaban, 1993). Some authors have suggested that arousal may inhibit central habituation and suppression of disorienting vestibular signals, or disrupt central integration of information for orientation, although the evidence is not conclusive (Beyts, 1987; Jacob, 1988). Certainly, the gain of the vestibulo-ocular reflex is enhanced in mentally alert subjects and markedly depressed by drowsiness (Möller et al., 1990). The effects of anxiety arousal are less well established, although Jacob et al. (1989) noted an abnormally high gain of the vestibulo-ocular reflex in a number of patients diagnosed as having panic disorder, and anecdotal clinical experience also suggests that anxiety may result in a very vigorous response to caloric testing without fixation, or enhanced

suppression of the vestibulo-ocular reflex with fixation (e.g. Hood, 1984). Central functioning may be even more severely affected if the arousal results in hyperventilation, which itself causes disorientation and confusion (Drachman & Hart, 1972; Theunissen et al., 1986).

Preliminary evidence that reported somatic anxiety symptoms may be related to genuine physiological changes is provided by a study of people complaining of vertigo provoked by head movements, which found that elevated somatisation scores and reported autonomic symptoms were correlated with objective measurements of increases in respiration rate following head movement (Yardley, Gresty, Bronstein & Beyts, 1993). Once again, a vicious cycle could develop whereby autonomic symptoms initially triggered by vestibular dysfunction result in anxiety and further physiological arousal, which then augments the vertigo. Some support for this model of the relationship between autonomic symptoms and vertigo is provided by the finding that perceived change in vertigo severity was related not only to initial levels of autonomic symptoms, but also to increases in autonomic symptomatology over a period of several months (Yardley, Luxon & Haacke, 1993).

Beliefs and coping appraisals

The preceding section was concerned principally with the way in which pre-conscious reactions to disorientation may affect the experience of vertigo, but it is important to remember that conscious beliefs and appraisals can also influence responses to vertigo, both directly and through their relationship with pre-conscious fears and arousal and with voluntary activity. Leventhal (e.g. Leventhal & Nerenz, 1985) has suggested that the relevant dimensions of beliefs about illness comprise conceptions of the identity and cause of the disorder, and expectations concerning the future development and consequences of the illness. The way in which uncertainty about diagnosis may contribute to the anxiety surrounding vertigo was discussed in Chapter 2. There is also ample evidence that uncertainty about what Leventhal terms the "time-line" of vertigo can lead to persistent apprehension. Because of the unpredictability of attacks, some people with vertigo never feel entirely secure:

[the confidence] has disappeared because it was always at the back of your mind, whether you were in the high street, wherever you were, that any time I bend down or turn around quickly I was -- I'd just bend down to pick up a bucket and I was on the floor with an attack, and I can't say I ever got used to them, even though I had them for such a long time.

The trouble is, you never know when it's going to come on. When I go anywhere I always think "Well, I just hope it won't", but in the back of my mind ... [awareness of the possibility] of it happening anywhere, 'cause it can do, but then you see if I just walk up the end of the road it could happen.

In addition, doubt about the longer-term prognosis can make it difficult to plan for the near and distant future:

It does frighten me because not knowing would it be all for the

rest of my life or will it go away? I think it has affected the way I think about the future a lot, not knowing what lies ahead. Every night I go to bed and I wonder "Will it be better in the morning or will it be worse in the morning?", and that is every night.

It's just the sort of feeling of "When's it going to end?", you know, is it going to be alright or am I going to be like this for the rest of my life?

I think that to have vertigo as well as deafness was quite a frightening prospect, to feel that perhaps my life was going to be inhibited by this, the outcome was unknown, which is -- with anything would be -- disconcerting.

In this respect, the uncertainty surrounding the probable course of the illness may make it more difficult to adjust and adapt to vertigo than to equally disabling but more inexorable, and therefore predictable, chronic conditions. Moreover, anxiety about the uncertain prognosis may be augmented by nagging doubts regarding the possibility that the symptoms are caused by serious disease:

A little knowledge is worrying, and you wonder what it is, whether it's a growth -- but that's in moments of stupidity.

Seen in the context of these, hardly irrational, concerns, the fear associated with disorientation is readily comprehensible. The contention, outlined in the preceding section, that "pseudoagoraphobia" resulting from dizziness may imply an anxious personality (Jacob, 1988) was prompted by the observation that military personnel exposed experimentally to disorienting conditions (such as a rotating room) generally develop motion sickness without phobia (e.g. Graybiel et al., 1965). However, it should be noted that many relevant factors differentiate the experience of experimentally-induced motion sickness and vertigo in daily life. The military subjects were precisely aware of the cause of their symptoms, that these were normal (indeed, were simultaneously experienced by their comrades) and had no sinister implications for either their mental or physical health. Their disorientation was predictable, and the spatial and temporal boundaries of the provoking situation were clearly defined. In contrast, ordinary people rendered unusually susceptible to disorientation as the result of balance system disorder are often unaware of the sensory system dysfunction, or even of the immediate provoking factors, which cause their vague and disturbing symptomatology. Medical professionals may be unable to discover or confirm an organic basis for their experience, or explain or predict their symptoms. These therefore come to represent an apparently arbitrary manifestation of some mysterious disorder, whose characteristics suggest the almost equally unpleasant alternatives of either a neural or a mental origin.

Extensive psychological research has shown that an unexplained, unpredictable experience attributed to internal origin is much more likely to cause anxiety than is a circumscribed, well-understood and ultimately controllable external set of circumstances (e.g. Miller, 1979; Steptoe & Adams,

1989). Hence, the effect of the additional uncertainties accompanying vertigo in daily life should be taken into account before concluding that predisposing anxiety or neurosis is a necessary precondition for the development of fear of disorienting situations in people prone to disorientation because of vestibular dysfunction. Certainly, pre-existing anxiety is likely to exacerbate any fear caused by disorientation. However, to date there have been no prospective or longitudinal studies showing that only those vertiginous people with high levels of trait anxiety or neuroticism develop a fear of disorienting situations. Many people might become wary if subjected frequently, unpredictably and inexplicably to levels of disorientation which we normally choose to endure only in tightly controlled situations, such as the five minutes we volunteer to travel (well strapped in!) on a fairground ride.

Although analyses of reactions to perceived threat often tend to assume that the fundamental cause of anxiety is an elementary fear of physical harm (e.g. Pyszczynski et al., 1991), most people with vertigo appear to be at least equally concerned about the social consequences of vertigo (a more detailed discussion of these is provided in the following chapter). In a study of the relationship between handicap and beliefs about the immediate consequences of vertigo, one hundred people with diagnosed balance system dysfunction completed a questionnaire assessing fears commonly associated with vertigo (Yardley, 1993a). Three main clusters of concerns were identified: fear of losing control; anxiety that the dizziness could be a sign of serious disease; and apprehension that the vertigo might become severe and cause vomiting. Concern about potential loss of control was much more common and more closely associated with levels of handicap than were the worries about sinister or severe illness. Moreover, detailed analysis of the fears relating to loss of control revealed that anticipated social consequences such as letting people down or acting strangely in public were strongly correlated with handicap (even after statistically controlling for levels of symptom severity and anxiety), whereas belief that the loss of control caused by dizziness might lead to physical harm (e.g. fainting, falling over) bore no relationship to handicap.

In addition to the effects on handicap and distress of beliefs about the causes and consequences of illness, both Leventhal and Lazarus (1991) stress the importance of beliefs about the availability of appropriate and effective coping strategies. The most striking characteristic of vertigo in this respect is the extent to which it often seems to sufferers to offer few obvious opportunities for constructive coping. A series of interviews, and a semi-structured questionnaire which specifically solicited descriptions of useful means of actively coping with vertigo (Yardley, 1991), produced remarkably few accounts of successful methods (apart from a few ingenious tactics detailed in Chapter 6). Both in these studies and in a questionnaire survey of people with Meniere's disease conducted by Austin (1992), the overwhelming majority of responses to questions about coping described restriction of activity, with many people also recommending medication use, and some mentioning rest, avoidance of stress, and attempts to distract oneself from symptoms, often by keeping busy. However, such coping strategies appear to constitute tentative exercises in damage limitation, rather than confident and successful means of overcoming the problem of vertigo. For example, in a questionnaire study of ways of coping with vertigo, efforts to escape the vertigo by keeping busy, fantasising, talking to others, sleeping or watching television more than usual, or consuming food, cigarettes, alcohol or

tranquillisers, were all associated with greater reported handicap and distress (Yardley, 1993b). Although the explanation for this positive correlation may well be that the more handicapped people were obliged to resort to these coping measures to a greater degree than those with mild vertigo, there was no evidence from longitudinal analyses that the use of these coping strategies had any beneficial long-term effects.

One of the principal problems faced by people when attempting to cope with vertigo is uncertainty about the relative costs and benefits of remaining active or resting. Many people find it difficult to decide which of these courses of action is appropriate, even when they have a clearly prioritised goal -- to minimise the vertigo:

I think there's two ways of trying to cope with it; trying to ignore it and doing as much as you would normally do, or failing that, just be very quiet, you know, and literally go to bed.

If I catch it in time, it will go as long as I don't try and go at a normal pace, as long as I think "Right, I'd better sit down this afternoon and it'll pass over" -- very often, within a few hours, it will do ... You get the really violent sort of attack, but then you can get something which is really a lot more mediocre, and that's the one you should try and work through, I think anyway -- if I'm feeling a bit off balance or something like that, then it's best just to go to work and work it out of your system.

However, the dilemma as to which mode of coping is preferable may be further complicated by a perceived conflict between the incompatible goals of avoiding activity which might cause vertigo and maintaining a fulfilling lifestyle. Powers (1973) provides an incisive analysis of the potentially disastrous consequences of trying to pursue mutually exclusive goals. Behaviour is at first directed towards one goal, but to the extent that the desired state specified by this goal is approached, progress towards the opposing but equally desired state diminishes. For example, the individual who embarks on a policy of "carrying on as normal" may be obliged to venture into situations perceived as incompatible with the aim of ensuring physical and social safety and competence. Conversely, the person who decides to prioritise preventative behaviour may find that, in order to avoid provoking dizziness, activity directed towards many other goals (exercising, travelling -- even working) must be progressively curtailed. The consequence is heightened anxiety and an increasing motivation to redirect behaviour towards the alternative goal. Eventually, if behaviour is constantly redirected as a consequence of antagonistic intentions, the individual simply oscillates impotently between the two desired states. The sense of helplessness this engenders was eloquently conveyed by many interviewees, who described their confusion and frustration at being unable to both avoid provoking vertigo and remain active:

I really am low at times, and I say "Oh, what a waste of my life, what a waste of time", 'cause I like to be doing something, you know, but I know I can't, and that's it. So when I'm low, I have to get busy. I can't let it rule my life, can I? I mustn't, I can't.

I find that some days I sit like a stuffed dummy, and I might not get it [vertigo], but how long can you sit like that?

Disorientation and information-processing

It was noted earlier (see first section of this chapter) that subjective descriptions of an association between stress and vertigo often confound emotional arousal with mental exertion or fatigue. Indeed, since emotionally challenging events frequently do involve urgent requirements for information-processing, such as appraisal of threat and coping potential or resolution of conflicting demands, it is conceivable that it is the cognitive load imposed by distressing events that is most relevant to the difficulties experienced by vertigo sufferers when they feel stressed. Moreover, accounts of the association between cognitive effort and disorientation suggest a possible bi-directional association; not only can demanding tasks provoke vertigo, but chronic vertigo also appears to disrupt concentration:

Well, I'm always frightened to do anything or to get involved in anything that's going to cause you a lot of stress. The concentration, that's what seems to get, upset me, as I say, like lip-reading or driving, or anything that requires a lot of thinking.

I got up very quickly and, you know, the old rotation starts, very gently, very gently, but I also find then I have the problem of remembering properly. It doesn't last long, it's seconds, it wouldn't be a minute, but I don't know -- your body wants to do one thing, and your mind isn't sort of tuned into it at the same time.

You drop things, you know, your concentration goes. I find that, say, I go to pick up the sugar-bowl, and it sort of goes everywhere, and then you have to clear that up. I don't really do anything properly, because the concentration definitely goes.

To the extent that orientation can be considered a perceptual-motor skill, and habituation a learning process (see Chapter 3), the relationship between vertigo and mental effort can be readily explained in terms of limited information-processing capacity (Kramer & Spinks, 1991). According to pure models of limited capacity, any task which demands attention and central processing will limit the availability of resources for competing mental tasks; hence, processing capacity devoted to orientation and habituation is unavailable for alternative mental activity, while high priority cognitive challenges may draw processing resources away from the task of orientation, resulting in a resurgence of dizziness and imbalance.

The possibility that disorientation and habituation may make significant demands on processing capacity offers an alternative explanation for the chronic fatigue and difficulty in concentrating of which people with vertigo frequently complain -- symptoms which are generally attributed either to the non-specific exhaustion and depression caused by illness, or to pre-existing anxiety or hypochondriasis. However, there is currently very little direct evidence in support of this explanation. Grimm et al. (1989) report that following a

whiplash injury which damages the vestibular organ many people experience fatigue and that performance on a wide range of cognitive tests may be impaired, but interpretation of these performance deficits is problematic because the performance of people with whiplash injuries might also be affected by their feelings of dizziness, apathy and depression, or even by slight brain damage. Moreover, examination of the performance of healthy subjects exposed to disorienting conditions has failed to identify any substantial performance decrements. Nevertheless, studies of adaptation to disorienting environments suggest that disorienting conditions do tend to cause fatigue even when they do not provoke dizziness, nausea or distress (Hettinger et al., 1990).

Despite the paucity of experimental evidence for the impact of disorientation upon cognitive functioning, the specificity of the cognitive deficits of which people with vertigo complain itself suggests a perceptual-motor or neuropsychological rather than an emotional/motivational explanation. A notable feature of the descriptions given by vertigo sufferers of their concentration difficulties is the frequency with which perceptual-motor tasks are, often unconsciously, identified as the most problematic. In the preceding accounts, the perceptual tasks of lip-reading and driving were singled out as a cause of difficulties, while physical clumsiness was given as an example of the effect of vertigo. Specific problems with activities involving visual perception are recounted repeatedly in descriptions of concentration difficulties:

There was another symptom that I had with it [vertigo] as well, a lack of concentration. I could pick that [note-book] up and read those notes there -- I couldn't get to the bottom of the page without my eyes wanting to stop, they just didn't want to know, I would have to force myself. Many a time I would have to put it to one side.

I play chess -- I used to play chess -- and I used to be good. I used to go to the chess club, and I packed that up because I started losing concentration and losing games a lot ... You are trying to look at the board, and things are moving around, and you think "No, I can't put up with that" ... I have been trying to read, you start reading the same line six times over before you get to the next line. That is the annoying part about it, I seem to be going over the same line instead of getting further down the page.

Moreover, people with vertigo are sometimes consciously aware of the mental effort that they have to devote to orientation and coordination:

I am walking along, and suddenly I find myself having to concentrate to walk, it didn't come naturally -- if I let myself, I would totter a bit ... sometimes I get up from my desk when I have been writing for a while, and I really have to think about walking to the tea machine.

Sometimes I find that if I'm not concentrating I'm suddenly going near the road or something, nearly wobbling into windows,

'cause you know it is a conscious effort all the time when you're walking about, especially outside, to keep yourself going and not meander over the pavements and things.

At a basic perceptual level, abnormal vestibulo-ocular reflex function may interfere with the fine control of pursuit and ocular stabilising mechanisms needed for reading and other tasks requiring a very steady eye (as the description of the dancing chess-board suggests), while the "poor concentration" to which the tendency to drop things was attributed by one interviewee might be due to incoordination associated with a momentary loss of balance. In addition, it is possible that the cognitive processing necessary to overcome disorientation may occupy channels or structures specialised for visuo-spatial processing, leading to competition for resources with other mental tasks which have a visuo-spatial element. Baddeley and co-workers have argued that certain activities make particular demands on central mechanisms involved in processing or temporarily storing visuo-spatial images (Baddeley, 1990); these activities include everyday pursuits such as reading, driving, and any task requiring mental manipulation of images, such as plans, maps, or flow-charts. There is existing evidence that controlled, attentive eye-movements, hand movements to spatial targets, and auditory spatial tracking tasks interfere selectively with visuo-spatial memory, presumably by introducing competing demands for attention or capacity (Baddeley & Lieberman, 1980; Baddeley, 1986; Smyth et al., 1988; Smyth & Pendleton, 1989). Maintenance of an upright posture under difficult balancing conditions has also been shown to interfere selectively with performance of visuo-spatial tasks (Kerr et al., 1985; Yardley, Lerwill, Hall & Gresty, 1992), while the disorientation induced by watching a rotating disc seems to disrupt the processing of a visual image in the same way that it affects visual perception (Corballis & McLaren, 1982). It therefore seems possible that the continuous effort needed to overcome disorientation, disequilibrium and disordered vestibular reflexes places a small but constant demand upon mechanisms for processing visuo-spatial information.

Towards a multidimensional approach to vertigo

Detailed consideration of the psychophysiological, cognitive and behavioural mechanisms which might mediate the association between the beliefs and emotions of people with vertigo and the nature and degree of their symptomatology and handicap reveals a multitude of possible multi-directional relationships. In addition to the possible contribution to dizziness of over-arousal, hyperventilation, cognitive demands, and attention to somatic changes, which was discussed in this chapter, physical symptoms may also be affected by anxiety-motivated behaviour. The most obvious example is the way in which avoidance of disorienting activities or environments actually prevents adaptation to the disorientation provoked by these situations, but this is not the only means by which dizziness can be partly caused by fearful behavioural reactions. For example, people who feel anxious or personally incompetent may be more likely to adopt a strategy of depending upon drugs for symptom control, but may thereby prolong their physical difficulties (since tranquillisers and vestibular sedatives tend to retard neurophysiological compensation). Alternatively, unconscious clenching or grinding of teeth, which is a fairly common component of the psychophysiological response to environmental events appraised as

stressful, can actually result in significant vertigo, amongst other symptoms (Rubinstein & Erlandsson, 1991).

Analysis of the relationship between vertigo and anxiety is further complicated by the probability that psychological and physiological predispositions, illness characteristics, and immediate circumstances are likely to have interactive effects. For one person, a tendency to worry about health combined with strong autonomic reactions to disorientation may combine to produce conditioned panic reactions to vertigo which was caused initially by balance system dysfunction. Another individual may find that the unpredictability of attacks and the mysterious inability to concentrate are a source of constant anxiety and self-doubt when trying to cope with a demanding job. In the following chapter this complex picture is elaborated by consideration of the wider social context, and examination of how the attitudes of other people, and social and practical demands and opportunities, can further modify the experience of vertigo and dizziness.