A STUDY OF EPISODES OF EMOTION IN DAILY LIFE USING THE EXPERIENCE SAMPLING METHOD

by

Ann S. Russell

A thesis submitted in conformity with the requirements for the degree of Master of Arts
Department of Human Development and Applied Psychology
Ontario Institute for Studies in Education
of the
University of Toronto

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Ann S. Russell
Department of Human Development and Applied Psychology
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Abstract

Structured diaries of incidents of emotion were collected from 65 participants using the experience sampling method. Participants carried on their persons an electronic organizer which beeped randomly throughout the day, prompting them to complete an emotion diary, thrice daily for a three-day period. This method tended to capture incidents of emotion that were less intense and of longer durations than those reported by previous researchers. Gender differences were observed in that women tended to experience both positive and negative emotion more intensely than men. Thoughts and bodily sensations were more frequently associated with negative emotions. Sixty per cent of emotion episodes were predicted correctly from the goal-relevant events that elicited them. With respect to the relationship between mood and emotion, this study found that anxious participants experienced both positive and negative emotion for longer durations than non-anxious participants. However, anxious participants did not experience more intense and more frequent episodes of negative emotion than non-anxious participants.
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Chapter 1

INTRODUCTION

As a question of scientific methodology there can be no doubt that the scientists have been right. But we have to discriminate between the weight to be given to scientific opinion in the selection of methods, and its trustworthiness in formulating judgements of the understanding.

Some of the major disasters of mankind have been produced by the narrowness of men with a good methodology.

Alfred North Whitehead, 1929

1.1. Overview

Scientific methodologies that employ objective measures of behaviour and/or physiology have provided much of the basis for contemporary theories of human emotion. The application of the objective method to the study of emotion may, in part, be traced back to Darwin's (1872) seminal work, *The Expression of the Emotions in Man and Animals*, in which he catalogued facial expressions of humans and other animals, and from which a theory of the universality of discrete emotions emerged. Following in Darwin's footsteps, contemporary emotion researchers have developed objective coding systems to measure facial expressions and identify specific emotions pan-culturally (Ekman & Friesen, 1978; Friesen & Ekman, 1984; Izard, 1979; Izard, Dougherty & Hembree, 1983). These coding systems allow for fine-grained analysis of the facial musculature associated with specific emotions and have encouraged
a proliferation of research regarding the biological substrates of emotion, and have shaped theories of discrete emotion (Izard, 1971; Ekman, Friesen, & Ellsworth, 1972).

Researchers have sought to identify unique autonomic and somatovisceral activity associated with specific emotions since James' (1884) contention that emotional experiences are associated with physiological activity. The study of the physiology of emotion has been greatly facilitated by twentieth-century advances in technology. Polygraph equipment enables researchers to conduct fine-grained measurements of autonomic correlates of emotion such as heart rate, peripheral skin temperature, respiration, galvanic skin response, muscular and brain wave activity. Magnetic resonance imaging technology enables researchers to observe neural brain activity associated with emotion.

However, recent neuropsychological investigators of emotion have questioned whether facial expressions and autonomic nervous system patterns are a valid basis for defining characteristics of discrete emotions. Davidson (1992, 1993) argued that invariant patterns of biological activity are most likely to be observed in the higher-order associative networks of central nervous system activity responsible for goal-directed behaviour and cognitive functioning, not at the microscopic level of analysis. Moreover, it may be questioned whether studies of behavioural and
physiological components of emotion contribute to psychologists' understanding of the phenomenology of discrete emotions in everyday life because they do not sufficiently describe the experience of emotion.

In the domain of phenomenological psychology, "researchers adhere to Schutz's (1962) postulate of adequacy, which lays down as a condition of acceptability of a scientific account of human action that it be understandable in terms of common-sense interpretation of everyday life" (Ashworth, 1993, p. 3). Recent approaches to the study of emotion also call for such an account. Oatley and Duncan (1992, 1994) proposed that scientific methodologies that rely exclusively on objective measures constrain investigators' understanding of the phenomenology of emotional experience in daily life. More specifically, they argued that in order to understand action, or emotion, at the level which is of interest to theoreticians and lay people alike, behavioural and physiological data are not sufficient: self-report data are also important (Oatley & Duncan, 1992, p. 289).

Studies of facial behaviour and autonomic activity typically capture fleeting emotions lasting only a few seconds and differ in kind from the emotional experiences individuals talk about, experience and observe in their daily lives. Individuals rarely perceive the minutiae of information gleaned from measurements of
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either behaviour or physiology. Take, for example, two acquaintances who exchange fleeting smiles of recognition while passing one another on the street. Of course, it is unlikely that either would reflect upon the muscle fibres activated in response to motor innervation while smiling (facial electromyography). Yet, they might even be unaware of their own smiles, and probably could not give detailed accounts of each other's facial expression. The exchange might however, trigger some kind of longer-lasting emotion, such as happiness at seeing a friend; or, sadness and regret that the relationship never developed into friendship. As humans, we are often unaware of behavioural and physiological activity at the researchers' level of interest and measurement, but further, we do not see ourselves as most researchers see us: our concepts seem to involve a different level of analysis.

Scientific objective methodologies have contributed a wealth of information in the domain of emotion at a micro-experiential level. However, in order to formulate judgments of understanding regarding the phenomenology of emotion in daily life, there is an increasing trend in the area of emotion research to study emotions at a different level of analysis: the kinds of emotions humans perceive, or take notice of, in themselves and others in activities of daily living. They are what Oatley and Duncan (1992, 1994) refer to as "mid-sized" consciously recognized emotions.
Subjective methodologies, such as self-reports or diaries of emotion and mood, have provided a means by which these phenomena may be investigated.

It is the intent of this paper to extend a specific body of research by Oatley and Duncan (1992, 1994) in which self-reports of diaries and moods have been used to study everyday occurrences of emotion. They suggest that subjective data yielded from structured diaries may broaden our understanding of human emotion in three significant ways: phenomenologically, epidemiologically, and theoretically. First, although emotions are at the centre of human mental and social life, the way in which emotions operate in daily life is not well understood (see also Oatley & Jenkins, 1992). Further, although emotions have a role in emotional disorders, such as anxiety disorders, that role is not clearly understood. Subjective phenomena associated with episodes of emotion are important to know if psychologists are to enhance the understanding of the experience of normal and pathological emotions. Secondly, by studying emotion in everyday life, one may develop a better understanding of the epidemiology (e.g., rates of occurrence and causal factors) of emotion. Thirdly, methodologies which capture the phenomenology and epidemiology of emotion in daily life are better equipped to inform theories of emotion.

With regard to the phenomenology and epidemiology of emotion
in daily life, Oatley and Duncan (1992, 1994) found that participants in their studies were adept at recognizing and reporting on "mid-sized" incidents of emotion in their daily lives. Most participants experienced at least one clearly consciously recognizable emotion daily. Among students (Oatley & Duncan, 1992), fear was the only one of the basic emotions (happiness, sadness, anger, and fear) experienced more frequently by women than by men (N=57). Students typically experienced happiness more often than any other emotion. The frequency of emotions for all participants differed as a function of living arrangement; students who lived alone, or with a partner, reported more episodes of happiness than students who lived with parents or friends. There were significant differences with regard to duration of emotion as a function of type of emotion, with happiness and sadness typically lasting longer than thirty minutes; and, fear and anger typically lasting less. Finally, almost half (47%) of all emotion episodes reported by students were mixed. In other words, when a basic emotion was experienced, students often believed they it was accompanied at "exactly the same time" by another emotion. The most common mixture was anger and fear.

Unlike the student sample, there were no gender differences in a non-student community/occupational sample (N=47) with regard to the frequency of occurrence of the basic emotions (Oatley & Duncan,
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1994). Compared to students, the occupational sample experienced more episodes of anger than happiness. With regard to intensity of emotion, men in the occupational sample did not experience any basic emotion more or less intensely than women, nor was any of the basic emotions experienced with different intensities. The basic emotions of happiness, sadness, anger, fear, and disgust were most frequently linked with goals associated with achievements, losses, frustrations, threats, and repellents, respectively. As for mixtures of emotions, the most typical mixture was that observed in the student sample, namely anger and fear. However, the occupational sample reported fewer mixtures of emotion than the student sample: 31% of all emotions were mixed for the occupational sample compared to 47% for the student sample. Finally, different emotions were associated with different sensations, thoughts and actions or urges to act. More specifically, fear was associated with more bodily sensations (e.g., bodily tension, stomach, heart) than any of the other basic emotions. Also, fear and anger were more likely to be associated with thoughts that "something bad might happen". With respect to action tendencies, or urges to act, happiness was most likely to be associated with urges to move closer and touch, hug, and caress. Anger was more likely to be associated with the urge to act aggressively.
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With regard to theory of emotion, subjective data from the Oatley and Duncan research have helped to corroborate the communicative theory of emotion (Oatley & Johnson-Laird, 1987; 1996 in press); namely that emotions function as communicators both within and between individuals, or intrapersonally and interpersonally. Emotions are caused by conscious or unconscious cognitive evaluations. These evaluations "signal" the basic or innate emotions of happiness, sadness, anger, and fear which are the foundations of moods and perhaps personality. Furthermore, these investigators suggest that attachment, parental love, sexual attraction, disgust, and interpersonal rejection are also basic or innate emotions, distinct from the first four in that they have objects (e.g., person or thing). In other words, happiness, sadness, anger and fear may be experienced without apparent external cause, whereas the second group of emotions may not. Additionally, according to these theorists, emotions are usually recognized by the following accompaniments: 1) conscious preoccupation (e.g., rumination or overly attending to an issue); 2) bodily sensations (e.g., racing heart beat, increase or decrease in skin temperature); and, 3) expressions (e.g., facial gestures, bodily postures, tones of voice).

The purpose of emotion, according to the communicative theory, "is to prepare body and mind for a general course of action
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appropriate to a general class of goals" (Oatley & Johnson-Laird, 1994, in press, p. 18). Emotions, therefore, are functional in that they encourage different kinds of action readiness (Oatley & Duncan, 1992). Emotions function to signal the cognitive system to respond or act in an appropriate manner. For example, in the face of danger or threat, the emotion of fear or anxiety signals the cognitive system to stop the current plan of action and mobilize the motor system for fight or flight (Oatley & Duncan, 1992). In short, emotions are inextricably linked to action and function in the management of goals and plans. Finally, this "goal relevance" theory of emotion suggests that: 1) emotions are elicited by events relevant to goals; 2) goals are of a generic nature (achievement, loss, frustration, threat and repellency) and correspond to specific emotions (happiness, sadness, anger, fear and disgust); and 3) emotions may be predicted from subject reports of triggering events.

The communicative theory of emotion served as the basis for the structured diaries used in the Oatley and Duncan studies. These investigators asked specific questions regarding the incidence of basic emotions, the intensity and duration of emotion in daily life, and the causes and accompaniments of emotion in order to confirm specific hypotheses. Likewise, this methodology also served to disconfirm the hypothesis that basic emotions tend
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to occur independently, with mixtures of emotion being rare. Structured diaries from both a student and occupational sample revealed that mixtures of emotion occurred in more than a third of the reported episodes. The structured diary was useful to explore the question about the co-occurrence of emotions; and, information yielded from this question had significant theoretical implications. Further, such mixtures are accommodated within Oatley and Johnson-Laird's (1996) revised communicative theory of emotion. They proposed that mixtures of emotion are likely to occur when individuals "react to events by making more than one cognitive evaluation, and such evaluations can create distinct emotions in parallel or in rapid alternation" (p. 378).

1.2. Improvements to diary methods using experience sampling

As previously mentioned, the structured diary method employed by Oatley and Duncan (1992, 1994) has made a threefold contribution to emotion research. However, this method also has two limitations. First, in Oatley and Duncan's (1992, 1994) student and occupational samples, participants recorded episodes of emotion 3 to 24 hours following the actual episode. Given the delay in recording, the accounts of emotion or mood captured by this method were retrospective. Some researchers suggest that accounts which rely on memory for emotions, are susceptible to errors of recall;
or, may be inaccurate reconstructions of the actual episode (Bruner, 1986; Loftus, 1982, 1994; Neisser, 1982).

Secondly, Oatley and Duncan's method used "intentional remembering" whereby participants are "primed to notice incidents of emotion and are equipped with forms to structure their recording of internal states and external events" (Oatley & Duncan, 1992, p. 252). This method may bias participants towards reporting only emotions or moods that are most salient or most intense. If participants reported only such intense emotional experiences, the method might not capture emotional experiences at the level of interest proposed by Oatley and Duncan themselves. In other words, priming participants might cue them to report "larger-sized" emotions, as opposed to "mid-sized" recognizable emotions which are, according to these theorists, the kinds of emotional experiences of most relevance to questions regarding the phenomenology and epidemiology of emotion in daily life.

In order to address such methodological limitations, Oatley and Duncan (1992) suggested a possible refinement of their self-report methodology: to randomly prompt individuals to complete emotion diaries during the course of daily routines. This idea was in part inspired by research by Csikszentamihalyi and Larson (1984), who used a pager sounding randomly during the course of daily routines, to signal adolescents to fill out structured mood
and activity questionnaires. This methodology has become known as the "experience sampling method" and has been also used effectively to investigate the following areas: anger among violent forensic males (Hillbrand & Waite, 1992); motivation and academic achievement among high school students (Wong & Csikszentmihalyi, 1991); activities, thoughts and moods among elderly persons (Hnatiuk, 1991); the relationship between affiliation motivation and gender (Wong & Csikszentmihalyi, 1991); classwork and homework among adolescents (Leone & Richards, 1989); and, daily self-care activities in early adolescents (Duckett, Raffaelli, & Richards, 1989). It is proposed then, that if the experience sampling method were applied to the study of emotion in daily life through randomly prompting participants to complete structured diaries, the problems of recency and saliency of intentional remembering, might be overcome.

1.3. **Anxious mood and everyday emotions**

Anxiety is part of humans' normal emotional repertoire. A sudden loud noise may make a person jump; writing an exam may make her nervous; seeing a stranger approach while jogging alone at night might cause a person to run faster, or tremble with fear. Normal anxiety therefore often functions to help one cope with danger by mobilizing the organism into "fight or flight" (Cannon, 1929). However, when anxiety is regularly experienced in the
absence of real threat or danger to oneself and negatively affects one's ability to cope with the demands of daily life, it may be part of a clinical entity, such as an anxiety disorder.

Of concern to both theorists and practitioners is how and why emotions are involved in dysfunction or pathology. For example, Russek and colleagues (Russek, King, Russek, & Russek, 1990) conducted a prospective study of 126 former college students on the effects of anxiety and subsequent physical illness. They concluded that the distinction between "normal" and pathological anxiety remains obscure. Although it is estimated that between 9 and 15 million people in the United States alone suffer from anxiety and/or panic disorder, the difference between those who develop clinical syndromes and those who do not is largely speculative (Barlow & Cerny, 1988). Oatley and Duncan (1992) argued that by understanding how "mid-sized" recognizable emotions are experienced in everyday life, psychologists are better equipped to understand the etiology of psychopathology. In other words, incidents of emotion, as recorded by anxious and non-anxious participants in daily emotion diaries may contribute to psychological understanding of both normal and pathological emotion.

Oatley and Johnson-Laird proposed that emotional disorders, such as anxiety disorders, are not merely "prolonged moods", but rather, more general conditions of distress, inclusive of normal
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emotions, brought about because "some event has occurred with a clear relation to the person's goal" (Oatley & Johnson-Laird, 1994, p. 14). Furthermore, they suggested that the term emotional disorder may be misleading. Rather, the emotions themselves may be intact, but the individual's life may be disordered (Oatley, 1992, p. 282).

By way of example, studies have shown that severe life stress is often an antecedent to the development of anxiety disorders. A study conducted by Last, Barlow and O'Brien (1984) found stressful life events precipitated onset of panic disorder in 91% of their agoraphobic sample. Stressful life events in their study were divided into three categories: 1) interpersonal conflict situations (e.g., marital or familial, and death or illness of significant other); 2) endocrinological or physiological reactions (e.g., birth, miscarriage, hysterectomy, or drug reaction); 3) other (e.g., major surgery, illness other than gynaecological, stress at work or school, move). Similarly, Brown and Harris (1978) found that 89% of a sample of women experienced a severe event or chronic difficulty preceding onset of clinical depression or clinical depression and anxiety (e.g., separation from a parent or husband, life-threatening illness, unemployment, etc.). Thus, according to the revised communicative theory of emotions, identified life stressors such as those outlined above, are events...
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(e.g., separation from partner) with clear relations to the individual's goals or plans (e.g., successful marriage). In short, emotions tend to be elicited when one experiences derailment or disruption of one's life plan and goals.

Oatley and Johnson-Laird suggest that incidents of emotion during psychopathological states, such as anxiety disorders, may differ from normal emotion in the following ways: 1) the intensity, duration, and frequency of episodes of emotion; 2) the comprehensibility of emotions to the sufferer; and 3) the extent to which they bring to mind previous episodes of the same kind (Oatley & Johnson-Laird, 1994, p. 14). For example, Duncan and Oatley (in preparation, cited in Oatley & Duncan, 1992) compared two groups of hospital out-patients: a psychiatric sample and a gastrointestinal (GI) sample. They collected emotion diaries from both groups and found that psychiatric out-patients reported an association with a current emotion incident and a past event 67% of the time, whereas the GI sample reported associations only 39% of the time. This again lends credence to the hypothesis that perhaps the emotional responses are normal in light of the severity of life events in psychiatric samples. In keeping with these efforts to understand the phenomenology and epidemiology of psychopathology in daily life, more such studies are needed.
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1.4. **Goals of the Study**

Generally, the goal of this study is twofold. First, I will investigate how a new method of data collection, a variation of the experience sampling method, with Oatley and Duncan's (1994) structured diary study. Secondly, I will investigate how mood affects a variety of measures. Specifically, I intend to investigate the following:

1. The advantages and disadvantages of the experience sampling method of daily episodes of emotion will be investigated with respect to the following questions:
   - What is the relationship between gender and emotion with regard to frequency, intensity, and duration of daily incidents of emotion?
   - What is the relationship between type of emotion incident and frequency of intrusive thoughts, autonomic accompaniments and action tendencies?
   - What is the relationship between types of emotion incident and the goal relevant events which elicit them?
   - What is the frequency of mixtures of emotion as a function of type of emotion?

   - Will anxious participants experience more episodes of negative emotion than non-anxious participants?
   - Will anxious participants' negative episodes of emotion occur more frequently when compared to the frequency of negative episodes of emotion for non-anxious participants?
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Will anxious participants' negative episodes of emotion be of a longer duration when compared to the duration of negative episodes of emotion for non-anxious participants?
2.1. Participants

There were 65 participants, 39 were female. Their mean age was 31; the range was from 18 to 51 years. Participants were recruited from undergraduate and graduate psychology programmes at the University of Toronto and the community. The majority of participants were students (N=50). Fifteen participants were employed adults from a variety of occupational backgrounds. All participants had a minimum of one year college or university education. Participants were paid $20.00 for their participation in this study. Data for this study were collected between October 1995 and November 1996.

2.2. Oatley and Larocque's Emotion Diary (version 7.1)

A revised structured emotion diary was used in this study (Oatley & Larocque, 1994)(Appendix A). The diary was a brief version of those used by Oatley and Duncan (1992, 1994). The first page was on paper and contained instructions on how to complete the study. To facilitate participants' recognition of emotions and moods, brief definitions of both were provided. Emotions were described as recognizable by the following markers: a bodily sensation; thoughts coming into mind that are hard to stop; and, acting or feeling like acting emotionally. Moods were described in
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terms of duration; a feeling of some kind lasting more than an hour. Finally, participants were required to answer a few personal and demographic questions.

The second page, the diary itself was programmed into the electronic organizer, and comprised eleven questions related to specific incidents of emotion or mood. First, participants were required to note the date and time of their entries (Item 1). Next, participants were asked to indicate the duration of the emotion or mood (Items 2 and 3). They were then asked to name and classify the emotion or mood (Items 4 and 5, respectively); classification categories (Item 5) corresponded to the basic emotions of happiness, sadness, anger, fear and disgust. A category, "none of the above", was also included for unclassifiable emotions and moods. The subjective intensity of the emotion or mood was rated on an eleven point scale from 0 = "not noticeable" to 10 = "as intense as I have felt in my life" (Item 6). Characteristic accompaniments of emotion, namely autonomic sensations, intrusive thoughts and action tendencies, were surveyed in Items 7, 8 and 9, respectively. Next, participants were asked briefly to describe, if aware, the event which elicited the emotion or mood (Item 10). Finally, participants were asked whether or not the emotion or mood was mixed, and if so to name the mixture (Item
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11). These eleven questions then, structured accounts that were considered "emotion diaries" for specific incidents of emotion or mood.

2.3. Procedure

Fifteen copies of the second page of the diary were programmed into a Sharpe electronic organizer for each participant and each participant kept the organizer for the course of their three-day participation in the study. The organizer was programmed to beep randomly four times per day, in the morning, afternoon, early evening, and late evening. Five seconds later, another beep would sound in case participants did not hear the original beep. These beeps signalled the participant to complete an emotion diary, or make entries according to the protocol, immediately.

Participants were required to complete three emotion diaries (entries) per day over a three-day period. One extra daily diary for each day was included in the organizer for participants who either missed an entry time, or were unable to complete a diary at a specified time. Also, three back-up diaries, called B1, B2 and B3, were included for participants in case of entry errors and the like. Therefore, although programs contained fifteen emotion diaries, participants were required to complete only nine diaries in total. An attempt was made to vary the effect of days of the
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week across participants. Therefore, some participants began the study at the end of the week, finishing on a Saturday or Sunday, while others began the study on a Saturday or Sunday and finished at the beginning of the week.

2.4. Training and Technical Support

All participants received approximately one half hour of individual training prior to beginning the study. More specifically, participants were instructed on how to use and operate the electronic organizer and how to recognize and record incidents of emotion and mood. There was some concern that participants not acquainted with using an electronic organizer might experience some technical difficulties since some basic computer skills were required. However, most participants reported that these operations became automatic after filling out the first few diaries.

All participants were encouraged to track diary entries by checking off boxes at the top of page three (E1 through E9) after specific diary completion. This suggestion was intended to help participants access the appropriate diary entry in the electronic organizer in case the organizer malfunctioned, and/or to prevent over-writing an already entered diary. Some participants complied with this suggestion whilst others did not. Non-compliance with
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this instruction did not affect data collection for any participant.

Participants were also provided with a telephone number for technical support and encouraged to call at any time over the three day period if they encountered difficulty with diary completion. Although the number of calls for technical support were not recorded, they were few, and were primarily due to expired batteries.

2.5. Reclassification of Emotion and Mood

For each incident of emotion, participants were asked to first name the emotion or mood and then classify it as either: happy/joy; sadness/grief; anger/irritation; fear; anxiety; disgust; or, none of the above. Out of the 452 episodes collected altogether, 100 episodes of emotion or mood were classified as "none of the above". Johnson-Laird and Oatley (1989) suggested emotional terms should "devolve upon one of the five basic emotion modes, or some subset of them". Therefore, two raters checked and re-classified the participants' emotional terms for all episodes of emotion or mood, including those labelled "none of the above", using Johnson-Laird and Oatley's corpus of emotional terminology. (See Johnson-Laird & Oatley, 1989 for a complete review).

Some of the reclassifications of "none of the above" (N=100)
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central simple data entry errors. For example, a participant may have called the emotion "happy", yet failed to select the appropriate category of "happy/joy". Other classifications involved mixtures of emotion. In this case, both raters read the content of the participant's description of the episode, and the most salient emotion was selected as the basis for recategorization. Finally, other terminology of episodes of emotion or mood concerned somatic or cognitive states, such as "tired" or "focused". These instances were left with the classification "none of the above". By such procedure, the original 100 episodes classified as "none of the above" were reduced to 30.

2.6. Categorization of Eliciting Events

A content analysis of Item 10 was conducted which asked participants to: "Please say briefly in your own words what you were doing, and what happened, if anything, to start the emotion or mood?" Following the methodology employed by Oatley and Duncan (1992 & 1994), responses were transcribed leaving blanks for any terms relating to emotion or mood. A rater, trained in this methodology, but blind to other data in the diaries, then categorized and assigned the transcriptions of eliciting events to one of five generic elicitors: Achievement, Loss, Frustration, Threat, and Repellent. Elicitors which could not be assigned to
any of these categories were assigned to an "Unclassifiable" category. Reliability of this method and of this rater has previously been established (Oatley & Duncan, 1992 & 1994). (See Appendix B for categorization criteria)

2.7. The Hospital Anxiety and Depression Scale (HAD Scale)

The HAD Scale (Zigmond & Snaith, 1983), a mood measure of clinical anxiety and depression, was completed by all participants (see Appendix C). The HAD Scale comprises fourteen items, half of which relate to anxiety and half to depression. Participants were instructed that their responses to HAD Scale items should reflect how they felt over the week prior to completing the scale.
A total of 573 emotion diaries were collected of a possible 585 in response to beeps by the electronic organizer. Ten participants completed only 8 of the 9 diaries requested, and one participant completed only 7. Of the total number of emotion diaries collected, 452 were records of emotion episodes of emotion or mood, and 133 (29%) were diaries which reported "no emotion" could be remembered preceding the beep.

Participants were asked to record when the emotion started and when the emotion ended. Of the emotion episodes analysed (N = 452), 65% of the episodes were occurring at the time of the beep (within 1 minute), and 76% of the episodes were experienced within a 15 minute period prior to the beep. As to the type of emotion occurring at the time of the beep, 65% of all episodes of happiness, 69% of all episodes of sadness, 53% of all episodes of anger, 69% of all episodes of fear, were occurring at the time of the beep.

3.1. Frequency of emotion as a function of gender

As to the frequency of emotion, Figure 1 below shows the daily rates of occurrence of different emotions as a function of gender.
Frequency rates were calculated for each person by dividing the number of each kind of emotion by the total number of diaries completed, and then by the number of days each participant participated in the study (three days). A repeated measures analysis of variance revealed no gender differences in frequency of any of the basic emotions of happiness, sadness, anger, fear,
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disgust, or other (F = 2.02; df 1,62; p = .16). Similarly, a
repeated measures analysis of variance revealed no significant
differences between the groups with respect to frequency of
positive or negative emotion (F = .003; df 1,59; p = .96). When
randomly prompted by the experience sampling method, both men and
women reported experiencing positive or negative episodes of
emotion at least once daily. Overall however, specific emotions
occurred at different rates of occurrence, and this difference was
significant (F = 51.5, P < 0.0001). Of the total number of emotion
episodes recorded, 44% were happiness, 12% were sadness, 20% were
anger, 17% were fear, 0.2% were disgust and 7% were "other".

3.2. Intensity of emotion as a function of gender
The intensity of the basic emotions of happiness, sadness,
anger, fear and disgust was determined by participants' responses
to Item 6 which asked participant to rate the intensity of the
emotion from 0 = "not noticeable" to 10 = "as intense as I have
felt in my life". The mean rating was 4.5 with very little
variation between emotions (happiness = 4.6; sadness = 5.1; anger
= 4.5; fear = 4.5; disgust = 4.0; other = 4.2). Only one
participant rated an episode of fear as "zero" on an 11 point
scale, and no participant endorsed the maximum rating of 10. Given
that each participant completed nine emotion diaries, but not all
participants experienced each of the five basic emotions, an
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average intensity of positive and negative emotion was calculated for each participant. This was achieved by rating all episodes of happiness as positive, while episodes of sadness, anger, fear and disgust were rated as negative. A repeated measures analysis of variance revealed that there was a marginal significant difference between men and women with regard to intensity of positive and negative emotions ($F = 3.88; \text{df} \ 1,59; \ P = .054$). The average intensity of positive emotion for men and women was 4.0 and 5.1, respectively. The average intensity of negative emotion for men and women was 4.6 and 4.9, respectively. In sum, women tended to experience both positive and negative emotions slightly more intensely than men.

3.3. Duration of emotion as a function of gender

Thirty-one per cent of all emotion episodes lasted less than 15 minutes, 22% lasted between 15 and 30 minutes, 19% lasted between 30 and 60 minutes, and 28% lasted longer than one hour. Anger had the shortest duration, with 45% of the episodes lasting less than 15 minutes. Sadness had the longest duration, with 40% of the episodes lasting longer than 60 minutes.

As to the duration of emotions as a function of gender, an average duration of positive (happy) and negative (sad, angry, fear, and disgust) emotion for each participant was calculated. A
repeated measures one-way analysis of variance of duration of positive and negative emotions revealed no significant differences between men and women ($F = 1.89; \text{df} 1,60; P = 0.17$). The mean durations of positive emotions for men and women were 63 and 47 minutes, respectively. The mean durations of negative emotions for men and women were 46 and 40 minutes, respectively.

3.4. Emotion episode and thoughts, action tendencies and bodily sensations

The relationship between type of emotion incident and frequency of intrusive thoughts, autonomic accompaniments and action tendencies is presented in Table 1 below.
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Table 1. Numbers of Instances in which Bodily Sensations, Thoughts, Types of Actions/Urges to Act were Recorded for Emotion Episodes as a Function of Emotion Type

<table>
<thead>
<tr>
<th></th>
<th>Happiness</th>
<th>Sadness</th>
<th>Anger</th>
<th>Fear</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(211)</td>
<td>(54)</td>
<td>(93)</td>
<td>(79)</td>
<td>(30)</td>
</tr>
<tr>
<td><strong>Thoughts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>50</td>
<td>37</td>
<td>49</td>
<td>51</td>
<td>11</td>
</tr>
<tr>
<td>Absent</td>
<td>158</td>
<td>17</td>
<td>43</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td><strong>Sensations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>98</td>
<td>38</td>
<td>51</td>
<td>57</td>
<td>16</td>
</tr>
<tr>
<td>Absent</td>
<td>109</td>
<td>16</td>
<td>41</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td><strong>Type of Action/Urge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moving Closer</td>
<td>57</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Aggressive Move</td>
<td>0</td>
<td>1</td>
<td>24</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Withdrawing</td>
<td>3</td>
<td>16</td>
<td>22</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>44</td>
<td>17</td>
<td>17</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td>None</td>
<td>104</td>
<td>13</td>
<td>28</td>
<td>27</td>
<td>16</td>
</tr>
</tbody>
</table>

The frequencies of intrusive thoughts, bodily sensations and type of action or urge for each of the emotion categories (happy, sad, fear, anger, and other) were calculated for each participant. Since there was only one episode of disgust, this episode was included in the category "other" for analyses. There was a significant relationship between specific emotions and the presence or absence of thoughts, $X^2 (4, N = 462) = 64.1, p < 0.0001$. Of the episodes of happiness reported, 76% were not associated with any
thoughts. Thoughts were more frequently associated with 69% of the episodes of sadness and 65% of the episodes of fear. Strictly speaking, the conditions for using chi-square analyses for the data depicted on Tables 1 and 2 are not met because the data include both between- and within-participant effects (since each participant recorded a number of emotions). Unlike the analysis of variance for continuous variables, there is no suitable test for categorical variables that treat between- and within-participant data. Therefore, I have used chi-square analysis not so much to give an accurate estimate of \( p \), but to indicate where there are substantial differences in the contingency tables.

The relationship between specific emotions and the presence or absence of bodily sensations was significant, \( X^2 (4, N = 462) = 19.3, p = .0007 \). Bodily sensations were more likely to be associated with negative emotions. Of the episodes of sadness and fear reported, 70% and 72%, respectively were accompanied by bodily sensations. Specific types of sensations were not collected by this diary method.

As to the relationship between specific emotions and action tendencies, the relationship was also significant \( X^2 (16, N = 463) = 178.7, p < 0.0001 \). Of the episodes of happiness reported, 81% were associated with "moving closer" and none of the happy episodes were associated with "making an aggressive move". Episodes of
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anger (77.42%) were associated with "making an aggressive move". The tendency to "withdraw" when experiencing an emotion was associated with the three emotions of anger (37%), fear (30%) and sadness (27%).

3.5. Emotion episode and goal relevant elicitor

The relationship between type of emotion incident and the goal relevant events which elicit them is presented in Table 2 below.

<table>
<thead>
<tr>
<th>Goal Relevant Elicitor</th>
<th>Happiness</th>
<th>Sadness</th>
<th>Anger</th>
<th>Fear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>147</td>
<td>8</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Loss</td>
<td>1</td>
<td>14</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Frustration</td>
<td>2</td>
<td>6</td>
<td>45</td>
<td>9</td>
</tr>
<tr>
<td>Threat</td>
<td>9</td>
<td>5</td>
<td>16</td>
<td>31</td>
</tr>
<tr>
<td>Unclassified</td>
<td>31</td>
<td>16</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Totals</td>
<td>190</td>
<td>49</td>
<td>88</td>
<td>70</td>
</tr>
</tbody>
</table>

As to the causation of emotions, participants' responses to Item 10, which asked participants to identify, if possible, the cause of the emotion or mood, were assigned by a rater to goal
Experience of Emotion

relevant categories of: Achievement, Loss, Frustration, Threat, Repellant, and Unclassifiable. Table 2 shows the frequency of goal-relevant elicitors as a function of emotion type. With respect to the hypothesis that elicitors derived from categorisations would predict which emotion had been experienced by the participant, this phenomenon is demonstrated by the relatively high frequencies in cells of the diagonal running from the top left corner to the bottom right corner of the top portion of Table 2. From the categorisation of goal-relevant events by a blind coder, 60% of emotion episodes were predicted correctly. (Chi-squared on the contingency table of Table 2 was 366.7, $P < .0001$). Episodes of sadness proved to be the most difficult of the basic emotions to categorize, as 33% of the causes of these episodes were "unclassifiable".

3.6. Mixtures of emotion

As to mixtures of emotion, the revised communicative theory of emotion suggests that mixtures are likely to occur. As demonstrated in Table 3 below, mixtures were frequently reported for the four basic emotions of happiness (37%), sadness (52%), anger (47%) and fear (42%). Of all the episodes ($N = 461$), 41% were mixtures of emotion, and only 42% were clearly unmixed. In addition, if participants had difficulty determining whether or not
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Basic emotions were mixed, a category called "unsure" was selected. In 14% of all episodes of happiness, 17% of all episodes of sadness, 17% of all episodes of anger, and 19% of all episodes of fear, participants had difficulty determining whether another emotion accompanied a basic emotion.

<table>
<thead>
<tr>
<th></th>
<th>Happiness</th>
<th>Sadness</th>
<th>Anger</th>
<th>Fear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed</td>
<td>77</td>
<td>27</td>
<td>43</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>(37%)</td>
<td>(52%)</td>
<td>(47%)</td>
<td>(42%)</td>
</tr>
<tr>
<td>Not Mixed</td>
<td>103</td>
<td>16</td>
<td>33</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>(50%)</td>
<td>(31%)</td>
<td>(36%)</td>
<td>(39%)</td>
</tr>
<tr>
<td>Unsure</td>
<td>28</td>
<td>9</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>(13%)</td>
<td>(17%)</td>
<td>(17%)</td>
<td>(13%)</td>
</tr>
<tr>
<td>Totals</td>
<td>208</td>
<td>52</td>
<td>92</td>
<td>79</td>
</tr>
</tbody>
</table>

3.7. Frequency of emotion as a function of anxiety

The relationship between anxiety as given by a standard clinical mood measure (HAD) and emotion with regard to frequency of daily incidents of positive and negative emotion is presented in Figure 2 below. Scores on the HAD scale were calculated for each
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participant. The majority of participants (N = 59) were assigned to one of two groups, anxious (N = 25) or non-anxious (N = 34), based on the scoring criterion for the HAD scale. Individual scores of 8 or more on the HAD anxiety items qualified participants as "anxious" (Zigmond & Snaith, 1983). Scores of less than 8 were labelled "non-anxious", but 4 participants did not complete this measure and were excluded from this analysis; two depressed, but not anxious, participants were also excluded.

Figure 2. Mean frequency and intensity of positive and negative emotion for anxious and non-anxious participants.
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As to the frequency of emotions as a function of mood, daily rates of occurrence of different emotions were calculated for each participant. Rates were calculated for each person by dividing the number of each kind of emotion by the total number of diaries completed, and then by the number of days each participant participated in the study (3 days). A repeated measures analysis of variance revealed no significant difference between anxious and non-anxious participants with respect to the frequency of any of the basic emotions ($F = 0.29; \text{df} \ 1,58; p = 0.59$). It was expected that anxious participants would experience more episodes of fear. Twenty per cent of all episodes reported by anxious participants were of fear, but 12% of all episodes reported by non-anxious participants were of fear; this difference was not significant. The hypothesis derived from the communicative theory of emotion (Oatley & Johnson-Laird, 1987, 1996, in press), that anxious subjects would experience more episodes of negative emotion was thus not supported.

In order to investigate whether anxious participants would experience more negative emotion than non-anxious participants, individual episodes for all participants were then rated as positive (happy) or negative (sad, anger, fear, disgust). For the frequency of positive and negative emotions for anxious and non-anxious participants, a repeated measures analysis of variance also
revealed no significant differences between the groups (F = .292; df 1,57; p = .59).

3.8. Intensity of emotion as a function of anxiety

For the intensity of emotions overall for anxious and non-anxious participants, Item 6 had asked participants to rate the subjective intensity of the emotion or mood on an eleven point scale from 0 = "not noticeable" to 10 = "as intense as I have felt in my life". The mean ratings for positive and negative emotion were calculated for each participant. Since not every participant experienced each emotion, it was impossible to perform an analysis of variance for specific emotions as a function of mood due to the problem of missing cells. Therefore, episodes of happiness were rated as positive, and sadness, anger, fear and disgust were rated as negative. A repeated measures analysis of variance revealed no significant differences between anxious and non-anxious participants with regard to intensity of positive and negative emotion. The average intensity of positive emotion for anxious participants was 4.6 and 4.7, respectively. The average intensity of negative emotion for anxious and non-anxious participants was 4.8 and 4.6, respectively. The hypothesis that anxious subjects would experience more intense emotions was thus not supported.
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3.9. Duration of emotion as a function of anxiety

As to the duration of emotions for anxious and non-anxious participants, an average duration of positive (happy) and negative (sad, angry, fear, and disgust) emotion for each participant was calculated. A repeated measures one-way analysis of variance of duration of positive and negative emotions revealed a significant difference between anxious and non-anxious participants ($F = 4.716$, df 16.8, $p = 0.03$). Anxious participants experienced both positive and negative emotions for longer periods of time than non-anxious participants. The mean durations of positive emotions for anxious and non-anxious participants were 69 and 46 minutes, respectively. The mean durations of negative emotions for anxious and non-anxious participants were 46 and 35 minutes, respectively. Thus, the hypothesis that anxious subjects would experience negative emotion for longer durations than non-anxious subjects was supported, as presented in Figure 3.
Figure 1. Mean duration in minutes of positive and negative emotion for anxious and non-anxious participants.
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Chapter 4

DISCUSSION

4.1. Summary of Results

This method tended to capture incidents of emotion that were less intense and of longer durations than those reported by previous researchers (Oatley & Duncan, 1994). Happiness occurred the most frequently, whereas episodes of disgust were rare. Gender differences were observed with respect to intensity of emotion: women tended to experience both positive and negative emotions more intensely than men. Thoughts and bodily sensations were more frequently associated with negative emotions. Sixty percent of emotion episodes were predicted correctly from the goal-relevant events that elicited them: happiness was typically caused by achievements, sadness by losses, anger by frustration, and fear by threat. Forty-one percent of the episodes of emotion were mixtures of emotion, and only 42% were clearly not. With respect to the relationship between mood and incidents of emotion, this study found that anxious participants experienced both positive and negative emotion for longer durations than non-anxious participants. However, two predictions derived from the communicative theory of emotion were not confirmed. Specifically, anxious participants did not experience more intense or more
frequent episodes either of fear, or of negative emotion than non-anxious participants.

4.2. Methodological Issues

The application of the "experience sampling method" in this study of emotion proved to be a fruitful endeavour for a number of reasons. First, this methodology was successful in avoiding the problem of recency of emotion encountered by other structured diary methodologies. More specifically, in Oatley and Duncan's (1992, 1994) structured diary studies, incident reports of emotion or mood were recorded three to twenty-four hours after the experience of emotion or mood. Methods that rely on intentional remembering, although arguably more reliable than incidental remembering (Nickerson & Adams, 1979, in Oatley & Duncan, 1992), are also susceptible to errors in recall or reconstruction. Of all the episodes of emotion or mood captured by the experience sampling method, the majority (65%) of the episodes occurred at the time of the beep (time elapsed 0 to 1 minute), and 76% of the episodes were experienced within a 15-minute period prior to the beep. This method then was effective in capturing episodes of emotion as they occurred, or shortly thereafter. Therefore, errors of recall might be less likely to occur since participants, for the most part, were recording episodes of emotion "in the moment" as opposed to recalling or reconstructing the incident retrospectively.
Secondly, in the Oatley and Duncan studies, participants were "primed to notice" and record episodes of emotion or mood, which may have unintentionally biased participants towards reporting only those episodes that were more salient or intense. Indeed, this suspicion was corroborated by the present study in that the relative intensity of emotion, compared to Oatley and Duncan's (1994) research, was lower. The mean intensity rating on an 11 point scale was 6.3 in an occupational sample (Oatley & Duncan, 1994) and 4.5 in this study. This finding would suggest that the experience sampling method captured emotions that were less salient and less intense than Oatley and Duncan's (1994) earlier study based on self-selected incidents.

Thirdly, the experience sampling method was effective in capturing an aspect of the epidemiology of emotion and mood not previously reported: the method was effective in measuring not only the presence, but also the absence of incidents of emotion in daily life. Of the 573 emotion episodes collected, approximately 23% of the diaries reported that "no emotion" was occurring at the time of the beep. Information regarding the absence of emotion in daily life is important from both epidemiological and clinical perspectives. Unfortunately, participants who participated in the experience sampling study were not asked to describe the events, thoughts and autonomic accompaniments associated with the absence.
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of emotion. Such information however, would be useful in future studies to further understanding of the reasons for the non-occurrence of emotions. For example, do certain contextual variables, such as being at school or work, encourage the suppression, or absence, of emotion? Does the absence of emotion indicate a lack of awareness of a "suppressed emotion" on the part of the participant; or, are significant portions of humans' daily lives simply "emotionless". These are questions which have both epidemiological and clinical relevance. By way of example, epidemiological information regarding the rates of occurrence of "no emotion" in daily life might help inform research in the areas of alexythimia (Taylor, Bagby & Parker, 1991) and/or "emotional intelligence" (Goleman, 1995). The experience sampling method seems to provide the mechanism through which the absence of emotion in daily life might be explored in further detail.

Finally, the experience sampling method proved to a very efficient method of data collection. Participants carried the electronic organizers on their persons throughout the three-day course of the study. Since the organizer was pre-programmed with the required number of diaries, participants were not encumbered by paper copies of diaries. More importantly, participants were prompted to complete the diary when the organizer beeped, which eliminated the need to remind participants daily by telephone to
complete emotion diaries, as was the case in Oatley and Duncan's (1992, 1994) studies.

4.3. Comparative Overview

I will now compare the results yielded from the Experience sampling method study on episodic emotion in the occupational sample (Oatley & Duncan, 1994). In so doing, I hope to illustrate the relative advantages of the experience sampling method in the study of emotion and address some questions which arise from these differences.

4.3.1. Gender and emotion

First, with regard to the relationship between gender and the intensity of emotion, Oatley and Duncan found that although women tended to experience incidents of the basic emotions (happiness, sadness, anger, fear and disgust) slightly more intensely than men, this difference was not significant. In the present study, however, when emotions were collapsed into categories of positive and negative, the women in the present sample experienced both positive and negative emotions significantly more intensely than men. This result is in keeping with research evidence that females report more intense experiences of both positive and negative affect compared to men (Fujita, Diener, & Sandvik, 1991; Diener, Sandvik, & Larsen, 1985).
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Assuming the importance of the marginal difference found, there are three possible reasons why the experience sampling method yielded gender differences with regard to intensity compared to Oatley and Duncan's study. First, specific emotions were collapsed into categories of positive and negative, unlike Oatley and Duncan's analysis which measured intensity of each emotion separately. According to Fujita and colleagues (1991) "results pertaining to gender can be expected to vary, depending on the response format and the mix of emotions represented in a given study" (quoted in Brody & Hall, 1993, p. 450). Secondly, participants in the present study completed three emotion diaries daily, compared to Oatley and Duncan's participants who completed, on average, only one. It is possible that gender differences are elusive, and more likely to be observed when participants are sampled over a number of occasions. Finally, as previously mentioned, participants in this study reported experiencing less intense emotions overall than did participants in Oatley and Duncan's occupational sample. It is possible that gender differences are less likely to show as the intensity of the experience increases. In other words, there may be an "equalizing" effect between men and women as the intensity of emotion increases. Further research would need to settle these questions.
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4.3.2. Duration of emotion

With regard to duration of emotion, it was found, using the experience sampling method, that 47% of the incidents of emotion lasted more than 30 minutes compared to Oatley and Duncan's study which found that only 33% of the episodes lasted more than 30 minutes. Again, this raises the question about whether the experience sampling method is able to measure duration of episodic emotion more accurately. The present data, while suggestive, are unable to settle the question definitively.

4.3.3. Frequency of emotion

With regard to the frequency of emotion, happiness was the most frequently experienced emotion in this study, occurring almost three times as often as sadness, anger and fear. In contrast, happiness occurred less often than anger in Oatley and Duncan's (1994) study, and just slightly more often than fear. However, among a student sample, Oatley and Duncan (1992) also found happiness to be experienced more often than any other emotion. Episodes of disgust were rare in all studies.

The difference between student and occupational samples however, raises the issue of what Stanovich (1996) refers to as the "college sophomore problem". Many psychological studies are conducted on student populations because of accessibility. However, the representativeness of findings to the general
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population is always an issue. Since the results of both the current study and Oatley and Duncan's 1992 study were similar with respect to frequency of episodic emotion, more studies on occupational samples are required to better understand the epidemiology of emotion in daily life.

However, the methodological differences between the current study and Oatley and Duncan's previous studies may also play a role. Oatley and Duncan's studies relied on memory for emotion, as opposed to the current study which captured most episodes of emotion as they were occurring. When participants are primed to recall salient emotions (structured diary study), the effect of greater intensity seemed to cause participants to bring to mind more negative than positive incidents of emotion. According to Reisberg and colleagues (1988), the quantity (e.g., level of arousal), not the quality, of affect (e.g., positive or negative) predicts memory vividness; and arousal serves to encourage encoding of information in memory. Therefore, the more intense the emotion, the more likely it will be remembered. In short, intense emotions may elicit more cognitive activity, and therefore are more likely to be remembered.
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4.3.4. Intrusive Thoughts

In the current study, it was found that negative emotions were more frequently associated with intrusive thoughts (69% of incidents of sadness; 65% of incidents of fear) whereas only 24% of incidents of happiness were associated with thoughts. It is possible that when emotions are of a low level of intensity, less cognitive activity is associated with positive emotion than negative emotion. For example, according to the revised communicative theory of emotion, negative emotions are typically associated with an interruption or derailment of a plan. Consequently, negative emotions may trigger more cognitive activity in the form of rumination about the derailment, or strategizing around getting the plan back on course. In contrast, positive emotions indicate that one's goals and plans are being realized; they may induce people to concentrate on what they are doing. Less intense positive emotions may not engender as much cognitive activity because plans are not in jeopardy of derailment. If so, less intense positive emotions may be more difficult to remember when participants are only primed to recall an emotion (Oatley & Duncan, 1994); they are, however, noticeable in the moment.
4.3.5. **Eliciting goal-relevant events**

This study investigated the relationship between the type of emotion incident and the goal-relevant events that elicit them. The communicative theory of emotion suggests that the basic emotions of happiness, sadness, anger, fear, and disgust are associated with "goal relevant events" of achievements, losses, frustrations, threats, and repellors, respectively (Oatley, 1992; Oatley & Duncan, 1994; Oatley & Johnson-Laird, 1987). Furthermore, these theorists suggest that the event itself may predict the emotion. Although, in the current study the same relationship between the basic emotions and goal relevant elicitors was found, the strength of prediction was apparently a little less than that reported by Oatley and Duncan (1994). Only 60% of the events correctly predicted the emotion in this study compared to 69% in the Oatley and Duncan study. Sadness proved to be the most difficult of the basic emotions to categorize; 33% of the episodes were "unclassifiable". This difference in prediction strength however, may have been a result of the lower intensities of episodic emotion. Given the lower intensity, it is entirely possible that the present individuals, may not have been as explicit with regard to describing the events that triggered or caused the emotion. Less intense emotions may not be associated
with specific events, but rather a series of non-specific, diffuse events in the course of their daily routines.

4.3.6. Mixtures of emotion

One tenet of the original communicative theory of emotions (Oatley & Johnson-Laird, 1987) concerned the frequency of mixtures of emotion. The theory suggested that two or more emotions are not likely to co-occur. This aspect of the theory was revised in 1996, to take account of these mixtures. In the present study, an even higher incidence of mixtures was found than in Oatley and Duncan's (1994) study. Forty-one per cent of all episodes were mixed in this study, compared to 31% in Oatley and Duncan's (1994) study. Furthermore, participants in the current study were only certain that 42% of episodes of emotion were clearly unmixed. Neither this method, nor Oatley and Duncan's structured diary method (1994), were able to distinguish between emotions which occurred simultaneously and those that occurred in rapid succession.

The present evidence corroborates the position that mixtures of emotion are typical in everyday life. To aid Oatley and Johnson-Laird's (1996) reformulation of the hypothesis regarding mixtures of emotion, I would further suggest that there exists an inverse relationship between intensity of emotion and frequency of co-occurrence. The lower intensities of emotion captured by the experience sampling method may have encouraged the participants to
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report more mixtures of emotion because the concomitant conflict arousal associated with competing plans or goals, was less intense. In other words, mixtures of emotion at lower levels of intensity, or arousal, may indeed set up a contingency of conflict, but the strength of the conflict is not so great as to cause participants distress or discomfort. Until this threshold of discomfort is exceeded, participants may be able to experience and report the conflict and indecision engendered by competing plans without too much difficulty. As the intensity of emotional discomfort increases, however, participants may be directed towards choosing between competing plans, reducing competing plans and focusing on only one. So, it is at this higher level of intensity, emotional mixtures are less likely to occur. In short, choosing between two or more competing plans may be more likely to occur at critical thresholds of arousal or emotional intensity. Below these levels, mixtures of emotion may be more likely to occur, or at least be reported. In a study conducted by Oatley and Duncan (1992), a student sample also reported high incidence (47%) of mixtures of emotion, however the intensity of these incidents was not measured. Future research regarding the relationship between intensity of emotion mixtures and effect on subsequent planning and decision making may help elucidate the phenomenon of mixtures of emotion.
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A final comment with respect to mixtures of emotion draws upon appraisal theory. Frijda (1993) suggested that emotions are "processes over time". More specifically, he suggested that emotions are temporally organized in that they develop over time and are influenced by pre-existing events, appraisals, cognition-emotion interactions, and so on. Cognitive elaborations may serve to elicit new emotion or modify existing emotion. In short, emotions are typically part of complex cognitive-emotion process occurring over time.

From this perspective then, how might mixtures of emotion be explained? I would suggest that mixtures of emotion, as reported in the current experience sampling study and in the Oatley and Duncan studies, may indeed have been part of more elaborate cognition-emotion processes. Frijda suggests that self-reports "have a limited value in determining emotion antecedents and, in particular, in determining appraisal processes leading to emotional arousal, experience, and response" (p. 382). The experience sampling method provides a mechanism through which temporal organization of complex emotion-cognition processes can be investigated more readily.
4.3.7. **Anxious mood and emotion**

With respect to the hypotheses of psychopathology put forth by the communicative theory of emotions, support for only one of the related hypotheses was found. There were no differences between anxious and non-anxious participants with regard to frequency or intensity of emotion. But the present study found that anxious participants tended to experience both positive and negative emotions for longer durations than non-anxious participants, corroborating the hypothesis that during psychopathological states, such as anxiety disorders, negative emotions will be experienced for longer durations.

However, these findings must be interpreted with caution for several reasons. First of all, there is evidence to suggest that the measure used in this study may not have been entirely appropriate. The Hospital Anxiety and Depression Scale (HAD Scale, Zigmond & Snaith, 1983) was chosen because it is simple, and has proven to be an effective screening measure of clinical anxiety and depression in hospital settings (Zigmond & Snaith, 1983; Bramley, Easton, Morely & Snaith, 1988). Some researchers caution against using the measure on populations outside of hospital settings (Bramley, Easton, Morely & Snaith, 1988). Despite this criticism, one must keep in mind that with regard to the epidemiology of clinical anxiety in the general population, this study did find
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that approximately half of the participants scored in the "anxious range" on the HAD Scale. These scores, taken on their own, may merely indicate routine anxiety problems, and not a "clinical" disorder.

Perhaps high scores on the HAD Scale actually reflected a relatively isolated state, rather than a recurring, debilitating pattern indicating a clinical disorder. Some theorists suggest that mood may be distinguished from emotion by one of the three following variables: longer duration, lower intensity, and diffuseness or globality (Isen, 1984; Morris, 1989, in Frijda, 1993). Indeed, participants who scored in "anxious range" of the HAD Scale experienced both positive and negative emotion for longer durations.

4.4. Implications for treatment

According to Plutchik (1993): "A general theory of emotions should have implications for the treatment of emotional problems and the reestablishing of normative functioning" (p. 64). Although this study attempted to investigate a specific theory with regard to normal versus pathological emotion, more research is required before any claims about what is normal versus what is dysfunctional can be made. I would however, like to mention implications for treatment of emotional problems with respect to methodological
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issues. Any suggestions are tentative because of the preliminary nature of the evidence.

Clinicians often require patients suffering from anxiety disorders to keep structured emotion diaries of episodes of anxiety (Beck & Emery, 1985; Barlow & Cerny, 1988). Participants are primed to attend to episodes of anxiety and chronicle subjective phenomena associated with these experiences in a structured diary. The experience sampling method may be a better method to use among clinical populations for the reasons established earlier. More specifically, structured diaries are typically not completed while the episode of emotion is occurring. Rather, clients tend to complete diaries daily or weekly. However, by priming clients only to attend to memory for episodes of anxiety, these self-reports may not accurately reflect short term fluctuations in emotion over time. In fact, the practice of having clients keep "anxiety diaries" may even cause clients to over-attend to episodes of anxiety. The current study found that positive episodes of emotion occurred as frequently as negative episodes of emotion for anxious and non-anxious participants. Thus, the experience sampling method could serve as an emotional "reality-check" for clients.

In sum, the present evidence indicates that the experience sampling method is an effective method of data collection; and, when contrasted with a structured diary method which used
intentional memory, seems to be capturing the subjective variations of emotion in the moment.

4.5. Limitations

The main limitation of this study was the small sample size (N = 65) and the brief duration of participation (3 days). In addition, the majority of participants in the sample were university students (N = 50), which, as previously mentioned, raises concerns with respect to the "college sophomore problem".

Next, the diary used in this study was a briefer version of those used by Oatley and Duncan (1992, 1994) and some questions did not solicit the same level of detail. For example, detailed information regarding kind of somatic accompaniments (e.g., heart racing, cold hands, etc.), causal agents, changes in emotion, and effects on subsequent plans, was not queried by this method. All this information is important to furthering psychologists' understanding of the phenomenology and epidemiology of emotion in daily life, and it is recommended that future studies expand upon diary version 7.1 (Oatley & Larocque, 1996) to include these questions.

Rumination was offered as a descriptor of emotion since it is typically associated with episodes of emotion (Oatley & Johnson-Laird, 1987, & 1996 in press). The question which tapped this phenomenon asked: "Did thoughts come into your mind that were hard
to stop, and make it hard to concentrate on anything else?"; followed by, "Please write down the main thoughts". In light of the finding that participants tended not to report thoughts associated with positive emotion in this study, one must wonder whether the question was misleading, or whether it was sufficiently comprehensive.

The reference to "thoughts" in context probably focused participants' attention on intrusive thoughts. The issues of recurring thoughts or thoughts in general may not have been tapped: participants experiencing happiness may not have experienced difficulty "stopping" thoughts. Rather they may have wanted to engage fully in thoughts associated with a positive experience of emotion. In other words, thoughts might have accompanied positive emotions, but the participant was desirous of engaging in these pleasant thoughts. The phrase "hard to stop" connotes some lack of control over one's cognitions, and perhaps the unpleasantness of such lack. In short, the question may have tapped only ruminative thoughts, and future revisions might well encourage report of ongoing (perhaps pleasant) thoughts in general. Subsequent, separate questions could tap whether the thoughts, once identified, were, unpleasant, intrusive, or hard to stop.

Although this study was an attempt at using a more sophisticated subjective methodology, the experience sampling
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method is wholly subjective (e.g., self-report). It is recommended that future studies also incorporate objective measures to complement this method. For example, there are now a number of portable polygraph instruments available for public purchase (e.g., portable hand-skin thermometer, heart rate and respiration monitors, etc.). By combining subjective and objective methodologies, investigators may come to a better understanding of the phenomenology and epidemiology of emotion in daily life.

Finally, use of the electronic organizer required some fluency with computers and data entry. The majority of participants who participated in this study were students who presumably had some basic computer training. Consequently, they required almost no technical support in their participation. Future studies which employ this method among occupational or community samples may require more intensive training than was needed here.

4.6. Conclusion

This study sought to determine the subjective phenomenon associated with emotion in daily life. I am hopeful that once methodological issues have been refined, the experience sampling method may help establish baselines, and further research on psychopathology of emotional experience.
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REFERENCES


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APPENDIX A: Emotion Diary - version 7.1 (page 1)

1. Today's date ___________________________ Current time ___________________________
   If you have not had an emotion since the last beep, enter NONE here and this particular diary is completed.
2. How long ago did your last emotion or mood start? ______ minutes.
3. How long did the emotion last? (If it is still happening, say how long up to now) ______ minutes.
4. What is your name for that emotion or mood? ________________________________
5. Would you call it a type of any of the following? (Check one.)
   Happiness / joy ☐
   Sadness / grief ☐
   Anger / irritation ☐
   Fear / anxiety ☐
   Disgust ☐
   None of the above ☐
6. How intense was the feeling? (Circle one below.)
   Not noticeable 0 1 2 3 4 5 6 7 8 9 10 As intense as I have felt in my life
7. Did you have any bodily sensations? (For example, heart beating, feeling hot or cold, tenseness etc.) No ☐ Yes ☐
8. Did thoughts come into your mind that were hard to stop, and make it hard to concentrate on anything else? No ☐ Yes ☐
   Please write down the main thoughts:
   ________________________________
   ________________________________
   ________________________________
9. Did you act or feel like acting in some way? (Check one or more.)
   Moving closer or touching ☐
   Making an aggressive move ☐
   Withdrawing ☐
   Other ☐
   No emotional actions or urges to act ☐
10. Please say briefly in your own words what you were doing, and what happened, if anything, to start the emotion or mood:
    ________________________________
    ________________________________
    ________________________________
11. Was the feeling mixed, so that there was more than one emotion or mood at exactly the same time? (Check one.) No ☐ Not sure ☐ Yes ☐
    If Yes, what were the two main emotions or moods that were in the mixture? ____________________ and ____________________

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Emotion Diary continued (page 2)

We would like you to keep this special diary of your emotions and moods in the next few days. You can recognise an emotion when
- a bodily sensation happens (such as your heart beating faster), or
- you have thoughts coming into your mind that are hard to stop, or
- you find yourself acting or feeling like acting emotionally

You can recognise a mood when
- you have a feeling of some kind that lasts for more than about an hour

Every time you receive a signal from the beeper, you are to complete a diary for your most recent emotion. The beeper will sound four times per day for three days. Once you have completed three emotion diaries in a day, you can ignore the remaining beep.

**Personal**

Please be as frank as possible. We only want to know about emotions generally. So don’t put your name on the diary. We will not keep a record of which diary belongs to any particular person.

We would like some personal information though, if you would not mind:

1. Age ______
2. Sex (Please check.) Male ☐ Female ☐

3. Living arrangements (Please check one.)
   (a) Living alone: in your own house, apartment, flat, or room; not shared ☐
   (b) Living with husband, wife or lover (with child or children) ☐
       Age of each child ______
   (c) Living with husband, wife or lover (without children) ☐
   (d) Living as single parent (with child or children) ☐
       Age of each child ______
   (e) Living with parents or relatives ☐
   (f) Living with friend or friends; in shared house, apartment, flat or room ☐
   (g) Other ☐ Please describe ____________________________________________

4. Your occupation ____________________________________________

5. Time and date when you started the diary Time ______ Date ________
APPENDIX B: Categorization criteria of eliciting events

L — Loss. Loss, lack, disappointment, or need of valued goal, for Subject, friend, relative, or for other person with whom Subject is identified, such as a confidant or person in a drama or documentary. Failing to achieve something, or being left out, in way that could lead to loss of self-esteem. Longing or thoughts of distant or unattainable friend. Recalling loss from past.
Examples Loss: S022: "Asked girl out — was turned down — with friends."
Disappointment: S041: "I went to an audition for a band and did not play well."
Need S002: "... felt really ill, could only think no one else was around to notice how I was feeling."
Longing SO21: "In my room alone studying, thinking about the person I wished I was with."

F — Frustration. Thwarted, or desiring a goal that has been blocked or made unattainable by the action or inaction of another, or of the self. Trying to do something, without completion. Something done to subject, or to friend, relative or other person the Subject is identified with, that is harmful, insulting or wrongful. Argument, quarrel or conflict with someone.
Examples Thwarting: S019: "Watching TV with another person who forces his commentary on me."
Wrongful: S006: "At home alone tidying up mess left by flatmates."
Argument: S036: "At home with father eating breakfast. He criticised me ... Then he spent about 20 minutes screaming."
Conflict S043: "... mother told me brother hadn't given her any keep money for the past 2 weeks — he used all his wages to pay off debt incurred by his habit — we live on a very tight budget."

T — Threat. Anticipation of a reverse or possible reverse to valued goal. Occurrence or anticipation of a danger. Exposure to possible future loss of esteem. Realization of a goal conflict or a resource limitation, e.g. of time, money, ability.
Examples Anticipation of reverse: S005: "Sitting on train to go home and sit my driving test."
Danger: S042: "I was in the street with friend, when a car almost knocked me over, i.e. I went in front of it by accident."
Anticipating danger: S003: "In the pub working. Punter asks me out. I say 'Yes'. Then I start to get ... in case he's a psychopath, 'cos I don't know him very well."
Limitation of resources: S001 "... reading an article — realizing how
much I have to get through before Finals."

R — Repellant. Object, situation or person that is noxious or objectionable.
Example  S029: "At the bus stop alone. Young boys in queue spitting, kicking the shelter etc."

ELICITED WITHOUT GOAL RELEVANT EVENT
C — Communicated emotion. Direct communication of emotion in response to an emotion in another person. Not elicited by a goal-based event as such.
Example  S006: "I had just phoned someone. It was their expression of ... that started the emotion."

CANNOT BE CLASSIFIED
U — Unclassifiable. Verbal description is insufficient to allow classification in the above scheme.
Examples  S007: "At home someone phoned unexpectedly."
          S014: "On own watching late film with ... scenes."
### APPENDIX C: Hospital Anxiety and Depression Scale (HAD)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
<th>Option 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel tense or 'wound up':</td>
<td>Mostly the time</td>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I still enjoy the things I used to enjoy:</td>
<td>Definitely as much</td>
<td>Not quite so much</td>
<td>Only a little</td>
<td>Hardly at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I get a sort of frightened feeling as if something awful is about to happen:</td>
<td>Very definitely and quite badly</td>
<td>Yes, but not too badly</td>
<td>A little, but it doesn't worry me</td>
<td>Not at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can laugh and see the funny side of things:</td>
<td>As much as I always could</td>
<td>Not quite so much now</td>
<td>Definitely not so much now</td>
<td>Not at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worrying thoughts go through my mind:</td>
<td>A great deal of the time</td>
<td>A lot of the time</td>
<td>From time to time but not too often</td>
<td>Only occasionally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel cheerful:</td>
<td>Not at all</td>
<td>Not often</td>
<td>Sometimes</td>
<td>Most of the time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can sit at ease and feel relaxed:</td>
<td>Definitely</td>
<td>Usually</td>
<td>Not often</td>
<td>Not at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel as if I am slowed down:</td>
<td>Nearly all the time</td>
<td>Very often</td>
<td>Sometimes</td>
<td>Not at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I get a sort of frightened feeling like 'butterflies' in the stomach:</td>
<td>Not at all</td>
<td>Occasionally</td>
<td>Quite often</td>
<td>Very often</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have lost interest in my appearance:</td>
<td>Definitely</td>
<td>I don't take so much care as I should...</td>
<td>I may not take quite as much care</td>
<td>I take just as much care as ever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel restless as if I have to be on the move:</td>
<td>Very much indeed</td>
<td>Quite a lot</td>
<td>Not very much</td>
<td>Not at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I look forward with enjoyment to things:</td>
<td>As much as ever I did</td>
<td>Rather less than I used to</td>
<td>Definitely less than I used to</td>
<td>Hardly at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I get sudden feelings of panic:</td>
<td>Very often indeed</td>
<td>Quite often</td>
<td>Not very often</td>
<td>Not at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can enjoy a good book or radio or TV programmes:</td>
<td>Often</td>
<td>Sometimes</td>
<td>Not often</td>
<td>Very seldom</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Do not write below this line*

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