

Some Relations Between Pleasant and Unpleasant Mood-Related Events and Depression

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This study is concerned with (a) the validity of two methods of identifying reinforcing and punishing events, (b) their interrelations and dimensional structure, and (c) their relation to depression. Participants, classified as depressed, nondepressed psychiatric, or normal control rated the frequency and the subjective enjoyability or aversiveness of 320 pleasant and 320 unpleasant events. Some subjects also monitored the occurrence of pleasant and unpleasant events and rated their mood on a daily basis. Correlations between each event and mood were calculated and used to identify 49 pleasant and 35 unpleasant "mood-related events." The proportion of subjects for whom the events correlated with mood and the mean enjoyability and aversiveness of the items were hypothesized to be measures of reinforcing or punishing impact. As predicted, statistically significant correlations between these two measures were obtained. The mood-related events also discriminated more strongly between depressed and nondepressed groups than the non-mood-related events did. The intercorrelations between pleasant and unpleasant events yielded separate and orthogonal dimensions of punishment and of reinforcement.

The present research was conducted within a framework that postulates that a low rate of response-contingent positive reinforcement is a critical antecedent of clinical depression (Lewinsohn, Weinstein, & Shaw, 1969). That is, it is assumed that the behavior of depressed individuals does not elicit reinforcement to a sufficient degree to maintain behavior and that a low rate of response-contingent reinforcement leads to a feeling of dysphoria, which is central to the phenomenology of depression. Thus, the concept of reinforcement is crucial to this approach to depression.

The theoretical status of the concept of reinforcement is controversial, not only in relation to depression (e.g., Beck, 1967), but also more generally (e.g., Estes, 1972). As an empirical generalization, reinforcement is quite straightforward. It prescribes the relation

between behavior and its consequences. Thus, Glaser (1971) defines a reinforcer as "an event, stimulus or state of affairs that changes subsequent behavior when it temporally follows an instance of that behavior" (p. 1). Throughout the various theoretical interpretations of reinforcement mechanisms, this description of reinforcing situations has remained relatively consistent. Some consequences increase the probability of the behavior they follow (positive reinforcers). Others reduce the probability of the behavior they follow (punishers). Whether an event has positive-reinforcing or punishing properties is inferred from its empirical effect on behavior.

In the laboratory it has been a relatively straightforward procedure to arrange and study behavior-contingent stimulus events that serve to increase or decrease the probability of future occurrences of the behavior (e.g., Ferster & Skinner, 1957). However, in non-laboratory situations, defining reinforcement and punishment in an analogous manner requires the continuous observation and coding of an individual's behavior and the covarying

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of stimulus events over a long period of time (e.g., Patterson, 1974; Patterson & Cobb, 1971; Libet, Lewinsohn, & Javorek, Note 1).

To cope with some of the practical problems in identifying events with reinforcing and punishing properties for depressed and other individuals, we have developed two psychometric instruments, the Pleasant Events Schedule (PES) (MacPhillamy & Lewinsohn, Note 2) and the Unpleasant Events Schedule (UES) (Lewinsohn, Note 3). The PES and the UES each contain 320 events generated by exhaustively sampling events that were reported to be sources of pleasure or distress by highly diverse samples of people. The schedules call for two responses to each item. The participant is first asked to rate the frequency of the event's occurrence during the past month on a 3-point scale. Second, the participant is asked to rate the subjective enjoyability (aversiveness) of each event on a 3-point scale. The frequency ratings are assumed to reflect the rate at which the events occurred during the past month. The enjoyability (aversiveness) ratings are assumed to reflect the potential reinforcing (punishing) impact of the events for the individual. The sum of the products of the frequency and impact ratings for all the events is assumed to provide an approximate measure of response-contingent positive reinforcement (punishment) experienced by the individual during the past month. The mean pleasantness (aversiveness) of each item (averaged across individuals) is assumed to reflect something about the reinforcing (punishing) impact of the events in the population at large.

We have used another related, but somewhat different, strategy to identify events with potential reinforcing or punishing properties: asking people to monitor the occurrence of specified events and to complete mood ratings on a daily basis for periods of 30 days or more. Specifically, we have had groups monitor either 160 pleasant events (Lewinsohn & Graf, 1973; Lewinsohn & Libet, 1972), or 160 unpleasant events (Lewinsohn & Talkington, in press). By studying the correlations between the occurrence of events and mood level, we have been able to show statistically significant ($p < .01$) covariation between feeling good and the occurrence of pleasant events and

between feeling bad and the occurrence of aversive events. Specific event-mood correlations for an individual are assumed to identify particular events that have reinforcing or punishing impact for that person. Events that are correlated with mood for a substantial (10% or more) proportion of the population (mood-related events) are assumed to represent events that have reinforcing or punishing properties in the population at large. The assumption is that events that are followed by good feeling have positive reinforcing impact, whereas events that are followed by dysphoria have punishing impact. This assumption may be traced back historically to Thorndike (1935), whose law of effect concerned the relation between pleasure and behavior. Thorndike postulated that responses that are accompanied, or closely followed, by satisfaction are more likely to reoccur, whereas those that are accompanied, or closely followed, by discomfort are less likely to occur. The hypothesis that mood-related events have reinforcing value is consistent with the work of Olds and Milner (1954), which suggests a link between pleasure and positive reinforcement.

From our previous studies (Lewinsohn & Graf, 1973; Lewinsohn & Talkington, in press) we have identified 49 pleasant¹ and 35 unpleasant mood-related events, that is, these events were shown to be significantly correlated with mood for 10% or more of the respective samples. These events are hypothesized to be of special relevance to depression (i.e., they are expected to be especially discriminating between depressed and nondepressed groups) and to reinforcement and punishment (i.e., they are expected to have high reinforcement or punishment value).

From the above-mentioned premises, the following predictions were made:

Hypothesis 1 (H1) and Hypothesis 2 (H2)

A positive relation exists between the mean enjoyability (aversiveness) of the PES (UES) items and the proportion of the population for whom the events are significantly correlated

¹ These and other materials are available upon request.

with mood. Our rationale is that because both measures are assumed to be measures of the reinforcing (punishing) impact of the events, they should be positively related. Confirmation of H1 and H2 would contribute to the construct validity of the mood-related events as measures of reinforcement or punishment potential.

Hypothesis 3 (H3) and Hypothesis 4 (H4)

Differences between depressed and non-depressed persons will be greater on the mood-related pleasant (unpleasant) events than on a control set of non-mood-related pleasant (unpleasant) events. Our rationale is that previous studies have shown that depressed persons engage in fewer pleasant activities and rate the pleasantness of activities lower than do nondepressed individuals (MacPhillamy & Lewinsohn, 1974). Depressed people also have a higher occurrence of unpleasant events and rate them as more aversive than do nondepressed persons (Lewinsohn & Talkington, in press). These findings could be explained by general changes in frequency and impact of all events or by relatively large changes in frequency and impact of a certain subset of events. Confirmation of H3 and H4 would argue for the latter interpretation and would document the special importance of mood-related events for depression.

The interrelations among the various measures of pleasant and unpleasant experiences were also of interest. These interrelations were examined to address questions regarding the dimensional structure of reinforcement and punishment, such as: Are the domains of pleasant and unpleasant events overlapping or independent? Are there bipolar dimensions of events defined by reinforcers at one pole and punishers at the opposite pole? For example, is there a single continuous "social interaction" factor defined by positive interactions, such as "Being with happy people" and "Being complimented" at its positive pole and by negative interactions, such as "Being near unpleasant people" and "Having someone criticize me" at its negative pole? At the level of the individual, does a person who rates "Doing a job well" as highly enjoyable, also rate "Doing a job poorly" as highly aversive? Although the idea of overlapping domains of

pleasant and unpleasant events comprised of several bipolar dimensions seems intuitively plausible, most of the available empirical evidence suggests independent domains of pleasant and unpleasant events. Thus Bradburn (1969) reported separate, orthogonal, positive and negative dimensions for psychological well-being; Tellegen (Note 4), for emotions; Herzberg, Mausner and Snyderman (1959), for work satisfaction; and Orden and Bradburn (1968) and Wills, Weiss and Patterson (1974), for marital happiness. On the other hand, Brenner (1975) found a strong negative correlation between the frequencies with which individuals reported themselves as experiencing positive and negative affects.

The interrelations between measures of unpleasant and pleasant events could also be used to examine relations between the rate of occurrence and subjective impact of pleasant events and the rate of occurrence and subjective impact of unpleasant events. A negative relation between the measures of pleasant and unpleasant events was suggested by two previous findings: (a) depressed persons as a group were found to rate the frequency and impact of pleasant events lower (MacPhillamy & Lewinsohn, 1974) and the frequency and impact of unpleasant events higher (Lewinsohn & Talkington, in press) than the nondepressed group; and (b) within individuals, the daily occurrence of pleasant events varied inversely with the daily rated aversiveness of unpleasant events (Grosscup & Lewinsohn, Note 5).

Method

Participants

Data from three separate samples were available. Sample 1 (Lewinsohn & MacPhillamy, 1974) consisted of 251 participants, about equally divided between depressed (D), nondepressed psychiatric (PC) and normal controls (N). Sample 2 (Lewinsohn & MacPhillamy, 1974) consisted of 459 normal participants. Sample 3 consisted of 199 participants about equally divided between D, PC, and N participants.

The participants in Samples 1 and 2, and the non-depressed controls in Sample 3, were recruited through a variety of public announcements to townspeople of the Eugene-Springfield area of Oregon inviting paid participation in psychological research. The participants were thus very heterogeneous in regard to age and educational and occupational levels. The diagnostic groups did not differ from one another in regard to socioeconomic status (Hollingshead, 1957).

Table 1
 Classification Procedure for Selecting Depressed and Nondepressed Subjects

Group	Classification criteria	
	Step 1: MMPI	Step 2: Grinker interview rating
Depressed	$D \geq 70T$ and $D >$ all other clinical scales ^a Or $D \geq 80T$	One or more factor scores > 1.0 Mean factor score $> .70$
Psychiatric Control	$D < 70T$ At least one clinical scale $\geq 70T^a$	Factor 1 (Dysphoria) $< .70$ Subject rated as having no current or major past problems with depression
Normal Control	$L < 60T$ All clinical scales $< 70T^a$	Mean factor score $\leq .35$ No factor score $> .70$ Subject rated as having no current or major past problems with depression

Note. MMPI = Minnesota Multiphasic Personality Inventory; D = Depression scale; L = Lie scale.

^a Clinical scales did not include the following: Lie, Test-Taking Attitude, Masculinity and Femininity, Hypomania, and Social Introversion.

The depressed subjects for Sample 3 were recruited by announcing, through both public media and community agencies, the availability of a depression treatment program.

For Samples 1 and 3 a two-stage screening process was used to assign participants to the diagnostic groups. This classification procedure employed the Minnesota Multiphasic Personality Inventory (MMPI) in complete (Sample 3) or abbreviated (Sample 1) form (Byrne, 1964) and the structured clinical interview rating form constructed and validated by Grinker, Miller, Sabshin, Nunn, and Nunnally (1961). The criteria for classification are presented in Table 1. The rationale and further details of this procedure are described elsewhere (Lewinsohn, Biglan, & Zeiss, 1976). The normal controls in Sample 2 were selected using only the MMPI with the Byrne (1964) scale criteria. Depressed participants were mildly to severely depressed with depression as the major problem. Psychiatric controls had mild to severe maladjustment other than depression. Descriptive information for the samples is provided in Table 2.

All participants signed informed consent forms and, except for the depressed subjects in Sample 3, were paid for their participation.

Procedure

The Pleasant Events Schedule Form III (MacPhillamy & Lewinsohn, Note 2) was administered to all participants. The participants rated each of the 320 items on frequency of occurrence during the past 30 days using a 3-point scale. They then rated the 320 items on subjective enjoyability also using a 3-point scale. The participants in Sample 3 also rated each of the 320 items of the Unpleasant Events Schedule Form I (Lewinsohn, Note 3) for frequency of occurrence during the past 30 days and for subjective aversiveness.

For each PES and UES item, three scores were computed: mean frequency, mean impact (enjoyability or aversiveness), and mean cross product (Frequency Rating \times Impact Rating).

Mood-Related and Non-Mood-Related Items

Mood-related (MR) pleasant ($n = 49$) and unpleasant ($n = 35$) events had been identified in previous studies (Lewinsohn & Graf, 1973; Lewinsohn & Talkington, in press). In these studies participants monitored 160 pleasant events or 160 unpleasant

Table 2
 Demographic Data and MMPI D Scores
 for Subject Samples

Group	n	% female	Mean age	MMPI D score
Sample 1				
D	86	57.0	30.0	85.1
PC	73	56.2	29.7	59.0
N	92	57.6	30.0	49.2
Sample 2				
N	459	58.6	44.5	50.5
Sample 3				
D	65	68.0	33.9	89.0
PC	60	58.0	25.7	57.5
N	74	51.3	29.9	50.5

Note. MMPI = Minnesota Multiphasic Personality Inventory; D = Depression scale; D = depressed; PC = psychiatric control; N = normal control.

Table 3
Mean Frequency and Impact Ratings of PES and UES Mood-Related and Noncorrelated Items

Ratings	MR items		Noncorrelated items		F	df
	M	SD	M	SD		
PES mean frequency	1.29	.35	.34	.31	1329	1, 1830
PES mean enjoyability	1.53	.20	.67	.30	1576	1, 1830
UES mean frequency	.84	.30	.43	.43	123	1, 438
UES mean aversiveness	1.20	.26	.81	.53	108	1, 438

Note. MR = mood related; PES = Pleasant Events Schedule; UES = Unpleasant Events Schedule. For all ratings, $p < .001$.

events and mood on a daily basis. The mood ratings were obtained by having the participants fill out one of the alternate forms of the Depression Adjective Check Lists (Lubin, 1965) at the end of each day for a period of 30 consecutive days. (A high score is indicative of negative mood.) Participants monitored the 160 PES (UES) items that they had rated as most pleasant (unpleasant). Mood-related items were defined as those that significantly correlated with mood ($r < -.30, p < .01$ for PES items and $r > .30, p < .01$ for UES items) for more than 10% of the population. Examples of PES MR events are "Having a frank and open conversation"; "Doing a job well"; and "Being relaxed." The UES MR scale consists of items such as "Working under pressure"; "Being insulted"; and "Arguments with spouse." Test-retest reliability coefficients for these two scales are between .7 and .8 (Lewinsohn & Talkington, in press; MacPhillamy & Lewinsohn, Note 6).

To define a control set of non-mood-related (NMR) items, events that were never correlated with mood were first identified. Seventy-nine PES and 92 UES items met this criterion. The intent was to select from these a subset of NMR items individually matched with the MR items on mean frequency and impact scores. As can be seen in Table 3, the mean frequency and impact ratings of the MR PES and UES items are much greater than the mean frequency and impact ratings of the noncorrelated items, and finding the required number of matched items proved to be impossible. Hence, we selected those noncorrelated items with the highest frequency and impact ratings. In this way, 14 PES non-mood-related items were selected with mean frequency $\geq .4$ and mean enjoyability $\geq .6$ (see Footnote 1). Although these items still differ significantly from the mood-related items (PES NMR mean frequency = .68, $SD = .19$; mean enjoyability = .92, $SD = .21$), they are felt to be an acceptable comparison group because their individual frequencies or enjoyabilities are not so low that correlation with mood seems unlikely a priori. Examples of PES NMR items are "Driving fast"; "Caring for houseplants"; and "Teaching someone." Similarly, 14 UES non-mood-related items were selected with mean frequency $\geq .3$ and mean aversiveness $\geq .7$ (see Footnote 1). The UES NMR items have a mean frequency of .50 ($SD = .14$) and a mean aversiveness of .94

($SD = .29$); both are significantly lower than UES MR ratings. Examples of UES NMR items are "Going to the doctor or dentist"; "Lending money or possessions"; and "Observing a quarrel or argument."

Results

Relation Between Mean Impact Ratings and Proportion of the Population for Whom an Item Correlates With Mood

Our first concern was with the degree of association between the enjoyability ratings for each PES item and the percent of the population for whom the item had been found to correlate with mood, across the 320 items. Consistent with H1, the Pearson product-moment correlation coefficient was .65 ($p < .001$).

The relation between the mean aversiveness rating of each UES item (based on Sample 3, $N = 199$) and the percent of the population for whom the item significantly correlated with mood was less strong ($r = .25, p < .001$). Examination of the scattergram suggested that the relation was attenuated by the fact that some of the most aversive items occurred with low frequency and, therefore, were significantly correlated with mood for only a few participants. For example, "Death of a close friend," which has a mean aversiveness of 1.86 (maximum = 2.0) and a mean frequency of .05, did not occur for any of the participants and, therefore, could not correlate with mood. It seems reasonable to assume that "Death of a close friend" would correlate with mood for most people if it occurred. This type of assumption is borne out for the item "Losing my girl/boy friend." This high-aversiveness (1.68), low-frequency (.11) item occurred for

2 of the 58 participants and was found to correlate significantly with mood in both cases. To eliminate or at least to reduce this problem, the correlation between mean aversiveness and the percent of the population for whom the item was correlated with mood was recomputed using only items with a mean frequency $\geq .2$ ($N = 228$). A stronger relationship was obtained ($r = .46$, $p < .001$).

Discriminative Power of Mood-Related Items

The comparative ability of the mood-related and non-mood-related items to discriminate between depressed and nondepressed persons was tested by means of a two-factor (Diagnostic Groups \times Item Types) analysis of covariance separately for the UES and PES frequency, impact, and cross-product scores. Analysis of covariance, with age and sex as covariates, was used because the diagnostic groups were not matched for age or sex distribution. As shown in Table 4, there was a highly significant main effect due to diagnostic class for all measures. (Depressed participants have lower PES frequency, enjoyability, and cross-product scores and higher UES frequency, aversiveness, and cross-product scores than the nondepressed participants; see Footnote 1). There was also a highly significant main effect due to item type. (Mood-related items are rated higher than non-mood-related items on all measures.) The interaction of Diagnostic Group \times Item Type, critical to H3, was highly significant for PES frequency and cross product, but not for the enjoyability ratings. H4 was also supported in that the Group \times Type interaction was significant for all three UES measures. The direction of this effect demonstrates that mood-related items discriminate more powerfully between depressed and nondepressed participants than do non-mood-related items.

The strength of the association between the pleasant and unpleasant mood-related items scale (cross products) and depression was assessed by computing simple and multiple R s between those scores and a dummy-coded group variable (Depressed = 1; Psychiatric Control and Normal Control = 0). The correlations were $-.43$ for the PES MR items, $.43$ for the UES MR items, and $.62$ for the multiple

Table 4
F Ratios Resulting From the Analysis of Covariance of Depressed vs. Nondepressed (Subject Class) and Mood-Related vs. Non-Mood-Related (Item Type) PES and UES Ratings

Ratings	Subject class	Item type	Class \times Type interaction
Pleasant Events Schedule			
Frequency	33.6***	1189***	8.8**
Enjoyability	12.1***	1051***	<1
Cross product	32.3***	1166***	22.0***
Unpleasant Events Schedule			
Frequency	8.8**	523***	20.6***
Aversiveness	15.7***	242***	4.4*
Cross product	40.4***	587***	39.7***

Note. PES = Pleasant Events Schedule; UES = Unpleasant Events Schedule.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

R. The latter is significantly ($p < .001$) greater than the two simple r s.

Interrelations Among Pleasant and Unpleasant Mood-Related Events

The relation between pleasant and unpleasant events was first investigated by computing and examining the intercorrelations among the impact ratings for all of the mood-related and non-mood-related items ($n = 112$). Strong positive correlations were found among pleasant events (40% of the 3,969 correlations were significant at the .01 level, $r \geq .25$) and among unpleasant events (44% of the 2,401 correlations were significant at the .01 level, $r \geq .25$). Interrelations between individual-pleasant and individual-unpleasant events, however, tended to be small. Of the 3,087 possible pleasant-unpleasant combinations, 71% had absolute values of less than .1. The absolute values of only 19 of these correlations were $\geq .25$. If it is assumed that all of the correlations have a population value of zero, 31 of the correlations would be expected to have a value $\geq .25$ by chance alone. It may be concluded, therefore, that no significant corre-

Table 5
*Events With High Loadings (>.4) on the PES Mood-Related Factors
 and the UES Mood-Related Factors*

PES mood-related factors		UES mood-related factors	
Event	Loading	Event	Loading
Factor 1 (23.2% of total variance)		Factor 1 (25.7% of total variance)	
Seeing old friends	.58	Having my spouse dissatisfied with me	.77
Having friends come to visit	.55	Realizing that someone I love and I are growing apart	.60
Being with friends	.51	Being near unpleasant people	.58
Being with happy people	.50	Learning a friend or relative has just become ill, injured, etc.	.53
Having coffee, tea, a coke, etc., with friends	.49	Talking with an unpleasant person	.52
Smiling at people	.47	Arguments with spouse	.49
Complimenting or praising someone	.46	Being dissatisfied with my spouse	.44
Thinking about people I like	.46		
Factor 2 (4.9% of total variance)		Factor 2 (4.7% of total variance)	
Kissing	.73	Being physically uncomfortable	.63
Petting, necking	.72	Having a minor illness or injury	.61
Having sexual relations	.70	Eating food I don't enjoy	.53
Expressing my love to someone	.51	Working under pressure	.49
Being told I am loved	.51	Performing poorly in athletics	.46
Being noticed as sexually attractive	.50	Being forced to do something	.45
Being with someone I love	.43	Bad weather	.41
Amusing people	.41	Not having enough money for extras	.41
Factor 3 (2.8% of total variance)		Factor 3 (3.3% of total variance)	
Being popular at a gathering	.61	Doing a job poorly	.49
Amusing people	.46	Realizing I can't do something I thought I could	.49
Being noticed as sexually attractive	.45	Having something break or run poorly	.48
Factor 4 (2.1% of total variance)		Factor 4 (3.0% of total variance)	
Being relaxed	.57	Doing something I don't want in order to please someone else	.47
Sleeping soundly at night	.51	Having someone disagree with me	.44
Saying something clearly	.50	Living in a dirty or messy place	.44
Having peace and quiet	.49	Being insulted	.43
Breathing clean air	.48		
Wearing clean clothes	.48	Factor 5 (2.6% of total variance)	
Doing a project in my own way	.48	Having too much to do	.61
Having people show interest in what I have said	.46	Having someone evaluate or criticize me	.49
Doing a job well	.45	Working under pressure	.44
Complimenting or praising someone	.44	Having someone disagree with me	.42
Thinking about people I like	.44		
Thinking about something good in the future	.43		
Wearing informal clothes	.40		
Factor 5 (2.0% of total variance)			
Being in the country	.57		
Seeing beautiful scenery	.57		
Watching wild animals	.50		

Note. PES = Pleasant Events Schedule; UES = Unpleasant Events Schedule.

lations were observed between the participants' impact ratings of pleasant and unpleasant events.

The total correlation matrix was then submitted to principal-components factor analysis with iteration. On the basis of the Eigenvalues it was decided to extract 10 factors, which accounted for 41.6% of the total variance (see Footnote 1). The factors were then rotated to simple structure by the varimax criterion. The results were very clear. No factor had loadings $\geq .4$ on both pleasant and unpleasant items (see Footnote 1). The results thus are consistent with the existence of independent domains of pleasant and unpleasant experience.

To clarify further the dimensional structure of the mood-related items, separate factor analyses were conducted on the impact ratings for the PES MR ($n = 919$) and the UES MR ($n = 199$) events. In each case, a principal-components factor analysis with iteration was used. Five factors were extracted and rotated to simple structure by the varimax criterion (see Footnote 1). The factor loadings for the PES MR items and the UES MR items are shown in Table 5.

The five factors extracted from the factor analysis of the PES mood-related items, which accounted for 35.0% of the total variance, were interpreted as Positive Social Interaction (Factor 1); Sex (Factor 2); Positive Feedback (Factor 3); Comfort and Competence (Factor 4); and Passive Outdoor (Factor 5). The five factors extracted from the factor analysis of the UES mood-related items accounted for 39.3% of the total variance. These factors were labeled Marital Discord (Factor 1); Physical Discomfort (Factor 2); Incompetence (Factor 3); Work Failure (Factor 4); and Work Pressure (Factor 5).

To further investigate the relationships between pleasant and unpleasant events, the degree of covariation between the overall rate of occurrence and subjective impact of pleasant mood-related items, and the overall occurrence and impact of unpleasant mood-related events, was examined. For each participant in Sample 3, the average frequency, impact, and cross-product ratings for the PES MR subscale and the UES MR subscale were computed. The intercorrelations between these six scales were then computed, and the results

Table 6
Correlations Between Pleasant Events Schedule (PES) and Unpleasant Events Schedule (UES) Mood-Related (MR) Subscale Ratings

PES MR Ratings	UES MR Ratings		
	Frequency	Aversiveness	Cross product
Frequency	.22*	.02	.04
Enjoyability	.05	.19*	.07
Cross product	.14	.11	.05

* $p < .01$.

are shown in Table 6. As can be seen, low but statistically significant positive correlations were observed between PES MR frequency and UES MR frequency and between PES MR enjoyability and UES MR aversiveness. All other correlations did not differ significantly from zero.

Discussion

Pleasant Events and Reinforcement

Hypothesis 1 was strongly supported. The proportion of the population for whom a PES item correlated with mood was strongly related to its mean enjoyability rating. In earlier studies (MacPhillamy & Lewinsohn, Note 6) it was shown that participants' enjoyability ratings of PES items were predictive of their subsequent choices of the prizes they received as payment for participation in a study. On the assumption that people select prizes having a maximum current reinforcement potential, the results were interpreted as supporting the construct validity of the enjoyability ratings as a measure of reinforcement potential. Confirmation of H1 in the present study is seen as providing further support for the construct validity of the enjoyability ratings and for the use of the percent of the population for whom a pleasant event is correlated with mood as a measure of the reinforcing potential of the event. The fact that the mood-related pleasant events were also rated as highly enjoyable suggests that these events constitute an especially potent set of reinforcers. In contrast, the non-

mood-related pleasant events were given low enjoyability ratings.

Aversive Events and Punishment

The results relevant to the relation between the mean aversiveness of events and the relative frequency with which they are correlated with mood (H2) were more complex. For moderately frequently occurring unpleasant events, a statistically significant association between the aversiveness ratings and the percent of the population for whom the item was correlated with mood was found. Thus, H2 was partially supported. The fact that some of the most aversive events occurred with very low frequency imposes a limitation on the use of percent of population for whom an aversive event is correlated with mood as a measure of the punishing impact of unpleasant events. Despite this limitation, the correlation between the occurrence of an aversive event and changes in mood may constitute a useful method for determining which everyday occurrences are most aversive for the individual. Intrasubject covariation would be needed to establish whether, given that an event occurred, the person's mood changed. It may be hypothesized that this conditional probability would be strongly related to the aversiveness ratings for all items.

Relations Among Positive Reinforcement, Punishment, and Depression

Conclusions that can be drawn from the results about the etiologic role of (a) the mood-related events and (b) reinforcement and punishment in the occurrence of depression are considerably more inferential. The mood-related pleasant and unpleasant events were selected for further study because in the previous studies (Lewinsohn & Graf, 1973; Lewinsohn & Libet, 1972; Lewinsohn & Talkington, in press) their rate of occurrence had been found to be associated with mood fluctuations in depressed and in nondepressed persons. Hence, they were hypothesized to constitute a set of activities and events with special importance for depression. Consistent with H3, depressed persons reported themselves as engaging less frequently in all

pleasant activities and were especially low on the mood-related pleasant events. In regard to H4, (a) the rate of occurrence of the mood-related unpleasant events was uniquely elevated in the depressives, that is, they did not report a higher number of non-mood-related aversive events and (b) while the depressives rated all unpleasant events as more aversive than the nondepressed controls did, the mood-related unpleasant events were rated by the depressives as being especially aversive. Thus, albeit in slightly different ways, the mood-related pleasant and unpleasant events were found to discriminate more powerfully between depressed and nondepressed groups than the non-mood-related control items. If one grants the construct validity of the mood-related events as measures of reinforcement and of punishment, then the obtained empirical results may be said to be consistent with a theoretical framework that postulates that a low rate of response-contingent reinforcement and an elevated rate of punishment constitute antecedents for the occurrence of depression (Lewinsohn, Youngren, & Grosscup, in press). However, because the present results are correlational in nature, alternative interpretations of the results are also possible: for example, a change in the rate of occurrence of mood-related events is secondary to depression. If causation operates in the latter direction, then the specific effect of depression on the mood-related events needs to be explained. Direct support for the hypothesis that a reduced rate of engagement in pleasant mood-related activities and an elevated rate of occurrence of unpleasant mood-related activities are antecedents for the occurrence of depression can only come from longitudinal studies of the sequence of events leading to depression.

Questions can also be raised about the reliability with which the depressives rated the events, especially the unpleasant ones. There has been concern in the "life events" literature (Brown, 1974; Rabkin & Struening, 1976) that depressed persons, while in the depressed phase, may rate the distressing surrounding events in their lives higher than controls do (retrospective contamination). In our studies (Lewinsohn & Talkington, in press; MacPhillamy & Lewinsohn, Note 6)

involving repeated administrations of the items over periods sometimes as long as 2 years, we have consistently found test-retest reliability to be adequate ($\geq .6$) and either as good or better, for depressed persons than for controls. Furthermore, the fact that results relative to H3 and H4 depend upon differences between the ratings of the mood-related and the non-mood-related control items makes it unlikely that the results can be attributed to the existence of a general response bias.

Relation Between Pleasant and Unpleasant Events

The results of this study are consistent in suggesting that rate of engagement in and experienced impact of pleasant events (positive reinforcers) and unpleasant events (punishments) comprise separate and independent domains. This conclusion, which is generally consistent with the results of other investigators using different methodologies (Herzberg et al., 1959; Orden & Bradburn, 1968; Wills et al., 1974), is based on the absence of significant intercorrelations among the pleasant and the unpleasant events measures and on the finding that each domain generated its own set of factors without any cross loadings.

There was a small but significant positive correlation between the PES and UES frequency ratings and between the PES and UES impact ratings. In other words, participants who reported themselves as engaging in more pleasant activities also tended to report a higher number of aversive events, and participants who attached high enjoyability ratings to the pleasant events also gave higher aversiveness ratings to the unpleasant events. The direction of these correlations is opposite to what had been expected. The findings suggest either the existence of response sets for frequency and impact ratings or small but consistent individual differences in general activity level and sensitivity to events. The magnitude of these correlations fortunately is very low and should not affect the interpretation of these scores.

The reported frequency of pleasant events was not correlated with the rated aversiveness of unpleasant events. Similarly, the reported frequency of aversive events was not correlated

with the rated enjoyability of pleasant events. These negative findings contrast with the results of another study (Grosscup & Lewinsohn, Note 5), in which the covariation, over 30 days, between rate of occurrence and impact of pleasant and unpleasant events was studied for each of 22 participants. In that study it was found that for individual participants, a high rate of occurrence of pleasant events attenuated the aversiveness of unpleasant events, whereas a high rate of occurrence of unpleasant events attenuated the pleasantness of pleasant events. The findings from the previous study (Grosscup & Lewinsohn, Note 5) suggest that these relations may differ depending upon whether inter-individual or intra-individual comparisons are made.

Pleasant and unpleasant events were found to comprise independent domains. At the same time, each was found to be significantly associated with depression. It may therefore be suggested that in the treatment of depression, separate diagnostic assessment of each is likely to be useful. To the extent that too little reinforcement and/or too much punishment are clinically inferred to be related to a given patient's depression, therapeutic interventions aimed at increasing the frequency and enjoyability of pleasant events and at decreasing the frequency and aversiveness of unpleasant events become relevant (Lewinsohn, Sullivan, & Grosscup, Note 7).

Because mood-related items have been shown to have a particularly strong relation to depression, therapeutic procedures that emphasize these events may be especially useful. Thus, Graf (1977) found that depressed persons who were helped to increase mood-related pleasant events improved more than depressed persons who increased non-mood-related pleasant events. Further experimental study and development of assessment and treatment techniques employing both pleasant and unpleasant mood-related events seems warranted.

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