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2 Running Head: RESPONSE TIME FRAME AND MOOD

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7 Influence of Response Time Frame on Mood Assessment

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Influence of Response Time Frame on Mood Assessment

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1 Abstract

2 The present study compared mood assessments using two different response time  
3 frames. A sample of 136 school children completed the Brunel Mood Scale (BRUMS) daily  
4 for five days using the response time frame, “How are you feeling right now?” On Day 5,  
5 participants completed an additional BRUMS, using the response time frame, “How have you  
6 felt over the past week including today?” “Past week” mood assessments yielded higher  
7 scores than multiple “right now” assessments, and were particularly associated with ambient  
8 mood for confusion, depression, and vigor. Researchers should give due consideration to the  
9 influence of response time frame on mood assessments.

10 Keywords: BRUMS, POMS-A, MEASUREMENT, CHILDREN, AMBIENT MOOD.

## 1 Influence of Response Time Frame on Mood Assessment

2 The number of studies involving mood assessment is large and growing rapidly. At  
3 least 500 published studies have used the Profile of Mood States (POMS: McNair, Lorr, &  
4 Droppleman, 1971, 1992) or its derivatives to assess mood. An important consideration in  
5 mood assessment is the choice of temporal reference period included in instructions to  
6 respondents, referred to in the present study as *response time frame*. McNair et al. (1971)  
7 offered four alternative response time frames for the POMS; (1) the standard instructions,  
8 “How have you felt over the past week including today?” (2) “How do you feel generally?”  
9 (3) “How do you feel today?” and (4) “How do you feel right now?” Other frequently used  
10 measures, such as the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen,  
11 1988), offer the same response time frames.

12 Despite the burgeoning research into mood, the impact of response time frame on  
13 mood assessments has received only limited attention. Watson (1988) is one of very few  
14 researchers to have addressed this issue. Watson found that, although the factor structure of  
15 mood remained constant, inter-correlations among mood dimensions and test-retest  
16 coefficients varied as a function of the response time frame used. Inter-correlations were  
17 weakest and test-retest coefficients highest with a “past year” response time frame,  
18 suggesting that a trait-like construct was being assessed, whereas a “right now” response time  
19 frame was associated with high inter-correlations among mood dimensions and low test-retest  
20 coefficients, appearing to reflect person-environment interactions at the time of testing.

21 More recently, Winkielman, Knauper, and Schwarz (1998) found that response time  
22 frame influenced the intensity of reported moods. Specifically, they found that when a short  
23 reference period was used, such as “Have you felt angry today?” participants reported less  
24 intense experiences compared to longer reference periods such as “Have you felt angry this  
25 week?” Winkielman et al. suggested that respondents interpret longer reference periods as an

1 inference that the researcher is interested primarily in intense reactions, as it would seem  
2 unrealistic to list every incident that generated a mild response. This perception appeared to  
3 strengthen as the reference period grew longer, for example to six months or a year, and  
4 therefore mood summaries over a long time period may be influenced unduly by relatively  
5 short but intense feelings, which inflate scores for the assessed moods.

6 More generally, it has been suggested that retrospective measures relying on recall  
7 have limited accuracy. For example, Rasmussen, Jeffrey, Willingham, and Glover (1994)  
8 showed that an “over time” assessment of mood for a period of three days differed  
9 significantly from the mean of 18 “right now” assessments collected during the same time  
10 period. The inaccuracy of retrospective recall has been shown in other areas of  
11 investigation, including recall of medical history (Cohen & Java, 1995), memory of pain  
12 (Eich, Reeves, Jaeger, & Graff-Radford, 1985), memory of childhood (Yarrow, Campbell, &  
13 Burton, 1970), and memory of coping ability (Ptacek, Smith, Espe, & Raffety, 1994; Smith,  
14 Leffingwell, & Ptacek, 1999). Smith et al. (1999) suggested that inaccurate recall could be a  
15 product of faulty or incomplete encoding, memory decay over time, or distorted recollections.  
16 They concluded that retrospective reports should not be treated as equivalent to measures  
17 taken with greater temporal proximity to the experience of interest.

18 A response time frame that requires recall of mood over time appears especially  
19 problematic given the proposed influence on memory of ambient mood (i.e., mood at the time  
20 of recall). It has been postulated that people tend to retrieve information from memory that is  
21 consistent with ambient mood. For example, Bower (1981) proposed, “a person in a  
22 depressed mood will tend to recall only unpleasant events and to project a bleak interpretation  
23 onto the common events of life, and these depressing memories and interpretations feed back  
24 to intensify and prolong the depressed mood” (p. 145). Further, the notion of mood-  
25 congruent recall (see Blaney, 1986 for a review) infers that memories are more accessible

1 when mood is similar to when the memories were originally encoded, although some studies  
2 (e.g. Parrott & Sabini, 1990) have shown mood-incongruency effects, i.e., individuals  
3 experiencing negative moods recall positive experiences to prevent mood from worsening, or  
4 to enhance mood.

5         Given the widespread use of the POMS and its derivatives, it would appear that  
6 further investigation of the extent to which response time frame influences the measured  
7 response is an imperative. Therefore, the purpose of the present research was to compare  
8 daily measures of mood with a mood summary for the same time period among adolescent  
9 participants, a population that has not previously been investigated in this context. Based on  
10 the findings of Rasmussen et al. (1994) and Winkielman et al. (1998), it was hypothesized  
11 that participants would report higher scores for the mood summary than for the mean of daily  
12 mood assessments. Based on the propositions of Bower (1981), it was further hypothesized  
13 that mood reports of the past week would be associated with ambient mood at the time of  
14 recall.

## 15 Method

### 16 *Participants.*

17         Participants were 136 school children aged between 11 and 16 years ( $M = 12.97$  yr.,  
18  $SD = 0.78$  yr.; male = 127, female = 9) recruited from secondary schools in southeast  
19 England. Demographically, participants represented a wide range of ethnic and socio-  
20 economic groups.

### 21 *Measures.*

22         The Brunel Mood Scale (BRUMS: Terry, Lane, Lane, & Keohane, 1999; Terry, Lane,  
23 & Fogarty, 2003) was used to assess mood. The BRUMS<sup>1</sup>, a derivative of the POMS, is a 24-

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<sup>1</sup> The Brunel Mood Scale was previously called the Profile of Mood States – Adolescents. It was renamed following the publication of recent evidence (Terry et al., 2003) showing it is equally relevant for adults.

1 item questionnaire of six subscales (anger, confusion, depression, fatigue, tension, and vigor)  
2 and was validated specifically for use with adolescent populations, using structural equation  
3 modeling techniques (see Terry et al., 1999). The authors reported internal consistency  
4 (alpha) coefficients ranging from .75 to .86 among young athletes and .79 to .85 among  
5 school children. In the present study, alpha coefficients ranged from .70 to .84.

6         The BRUMS was used in preference to other measures of mood for several reasons.  
7 First, its short completion time (2 - 3 minutes) suited the multiple assessment design of the  
8 present study. Second, the measure was initially validated specifically for use with school  
9 children. Third, relevant normative data are available. Fourth, an alternative item list (c.f.,  
10 Albrecht & Ewing, 1989) is also available. The daily mood assessment used the response  
11 time frame, “How do you feel right now?” and the mood summary used the response time  
12 frame, “How have you felt over the past week including today?” A culturally-appropriate  
13 alternative word list was made available to minimize possible misunderstandings, although  
14 none of the participants asked to refer to this list.

15 *Procedure.*

16         The Head Teacher of each school granted permission to conduct the study and all  
17 participants were treated in accordance with the ethical standards of the American  
18 Psychological Association. Classes were selected randomly and pupils were given the option  
19 of taking part or withdrawing from the study. From Monday through Friday, participants  
20 completed a daily mood assessment during their normal classes, at approximately the same  
21 time each morning to avoid potential diurnal fluctuations in mood (Karageorghis, Dimetriou,  
22 & Terry, 1999; McNeil, Stones, Kozma, & Andres, 1994). Also, given Parrott and Sabini’s  
23 (1990) proposal that an emphasis on mood responses may cause participants to dwell on  
24 mood-congruent information, neither the class teachers, who administered the mood  
25 assessments, nor the participants were told the precise nature of the study. Participants

1 completed the “past week” assessment after the final “right now” assessment had been  
 2 collected on Day 5 of the study. Completed questionnaires were screened during the period  
 3 of data collection for signs of significant mood disorder among participants, although none  
 4 were found.

5 *Data analysis.* All data were converted to T-scores using normative data for the  
 6 BRUMS (Terry et al., 1999) derived from the responses of adolescent school children in a  
 7 classroom setting. Scores for each of the “right now” assessments were combined into a  
 8 mean score for the week. Data were screened for outliers using the Mahalanobis distances  
 9 method (see Tabachnick & Fidell, 1996) and one case was removed from the dataset, leaving  
 10 135 cases to go forward for analysis. Data analysis had two stages. First, a repeated  
 11 measures multivariate analysis of variance (MANOVA) was used to compare the mean daily  
 12 assessments with the end of week mood summary. Second, standard multiple regression was  
 13 used to examine the extent to which each daily mood assessment predicted the summary  
 14 assessment.

## 15 Results

16 Descriptive statistics for daily measures of mood are contained in Table 1.  
 17 MANOVA showed a multivariate difference between the mean of daily mood assessments  
 18 and the mood summaries (*Wilks'  $\lambda$*   $_{6,128} = .72$ ,  $p < .001$ ,  $\eta^2 = .28$ , see Table 2). Univariate  
 19 tests showed, as hypothesized, that mood scores assessed using the “past week” response  
 20 time frame differed significantly from the same measures assessed using the “right now”  
 21 response time frame. For all six dimensions of mood, the summary scores were higher than  
 22 the mean of the daily assessments.

23 Multiple regression, to predict mood summaries from daily mood assessments,  
 24 showed that overall variations in the daily mood assessments accounted for 36% of the  
 25 variance in anger ( $F_{5,129} = 15.90$ ,  $p < .001$ ); 45% of the variance in confusion ( $F_{5,129} = 22.63$ ,



1  $p < .001$ ); 37% of the variance in depression ( $F_{5,129} = 16.63, p < .001$ ); 41% of the variance  
2 in fatigue ( $F_{5,129} = 19.35, p < .001$ ); 50% of the variance in tension ( $F_{5,129} = 27.59, p < .001$ ),  
3 and 36% of the variance in vigor ( $F_{5,129} = 16.31, p < .001$ ). These proportions of predicted  
4 variance are relatively low, given that the measures are ostensibly measuring the same thing.  
5 It can be seen from Table 3 that the mood assessment for Day 5 accounted for the largest  
6 proportion of variance in summary mood scores for anger, confusion, depression and vigor,  
7 and the second largest proportion of variance for tension scores. For fatigue, summary mood  
8 scores were best predicted from daily mood scores for Days 1 and 2.

### 9 Discussion

10 The purpose of the present investigation was to compare mood assessments using  
11 “right now” and “past week” response time frames. We assessed mood among a sample of  
12 school children during a normal school week, where it was assumed that mood would remain  
13 relatively stable. However, the daily mood reports showed signs of a “Friday feeling” among  
14 participants, with Day 5 values for anger, confusion, depression, fatigue, and tension at their  
15 lowest points for the week. To avoid this potential confound in future investigations, follow-  
16 up studies might consider controlling for day-of-the-week effects by randomizing the starting  
17 and end points of the “right now” and “past week” assessments.

18 Mood reports for the same 5-day period, assessed using the different response time  
19 frames, varied significantly. As hypothesized, mood scores measured using the “past week”  
20 response time frame were higher than the mean “right now” scores for all mood dimensions.  
21 The present findings supported the proposal of Rasmussen et al. (1994) and Winkielman et al.  
22 (1998) that “over time” summaries tend to exaggerate perceptions of the intensity of mood  
23 responses and showed that this effect extends from adult to adolescent populations.

24 The “right now” mood assessments predicted between 36% and 50% of the variance  
25 in the “past week” assessments. This predicted variance is relatively modest, given that the

1 different assessments of mood pertained to the same time period. The “right now” mood  
2 assessment for Day 5 was by far the best predictor of “past week” mood. As these two  
3 assessments were completed one after the other this is not surprising. However, it illustrates  
4 the difficulty of producing an accurate summary of mood over time, and emphasizes the close  
5 association between ambient mood and the recall of past moods (Bower, 1981; Ellis &  
6 Ashbrook, 1991; Rasmussen, et al., 1994; Rusting, 1998).

7         The present findings support the notion that response time frames requiring mood  
8 recall are difficult to interpret, as it is impossible for a researcher to know if a mood  
9 assessment is influenced by mood maintenance or mood repair strategies, whether it  
10 represents ambient mood, or whether it is an accurate summary of mood over the reference  
11 period. The present findings suggest that “past week” mood summaries may not be accurate  
12 representations of the moods experienced during that period. It is acknowledged, however,  
13 that the present investigation only assessed mood at five points in time, which may not  
14 represent the full range of mood responses during the week in question.

15         Although the present study demonstrated significant differences in reported mood  
16 associated with the response timeframe, the clinical significance of these differences is  
17 unclear. The magnitude of the differences varied from just over one point on a standard scale  
18 (for confusion) to just under five points (for fatigue), differences of up to approximately half  
19 a standard deviation. Clinically, such a difference may represent nothing more than an  
20 expected level of measurement “noise”, although it is quite conceivable that it might move  
21 individuals across an important T-score threshold, such as from below to above the 50<sup>th</sup>  
22 percentile. However, given that mood scales are used extensively for research purposes, a  
23 measurement factor that, in itself, represents a significant effect can be seen to be a cause for  
24 concern.

1           An issue for researchers who assess mood is how to distinguish a general underlying  
2 mood from a specific emotional response to situational cues. A limitation of the “right now”  
3 response time frame is that it is susceptible to fleeting emotions, whereby participants might  
4 report feelings that are not consistent with their underlying mood. For example, due to a very  
5 recent incident, someone might report a high score for anger even though the anger might  
6 dissipate soon after. Therefore, if mood was assessed even a few minutes later or before the  
7 incident had occurred, a different anger score would be evidenced. On balance though, we  
8 suggest that the “right now” response time frame should be the method of choice for use with  
9 mood scales based on the POMS. If a researcher is interested in mood responses over time,  
10 then multiple “right now” assessments should probably be made. An alternative approach  
11 might be to assess both recalled mood (i.e., “past week”) and ambient mood (i.e., “right  
12 now”) and partial out ambient mood to correct for its close association with recalled mood.

13           In light of the suggestion (e.g., Watson, 1988) that response time frame determines  
14 whether a trait-like construct or interpersonal/environmental influences at the time of testing  
15 is assessed, an interesting extension to the present study would be to investigate their  
16 differential effects; for example, in relation to the prediction of students’ grades, relationships  
17 with teachers and peers, and other important outcomes for adolescents. Moreover, it would be  
18 interesting to investigate the extent to which the effects of response time frame and ambient  
19 mood upon mood reports, highlighted in the present study, are generalizable across  
20 adolescent populations or are idiosyncratic, perhaps reflecting individual variability in the  
21 introspective ability to report mood responses. Given the relative modest size of the sample  
22 used in the present investigation, replication of the observed effects among other groups of  
23 similar participants would help to confirm the generalizability of findings. Also, follow-up  
24 studies taking a more person-centered, rather than variable-centered, approach perhaps using  
25 qualitative as well as quantitative techniques would appear to be warranted.

1           In summary, “past week” mood assessments were shown to differ significantly from  
2 multiple “right now” assessments and recall of mood appeared to be influenced significantly  
3 by ambient mood. The present results serve to validate the conclusions of previous  
4 researchers (e.g., Rasmussen et al., 1994; Winkielman et al., 1998) but make a unique  
5 contribution by showing that the effects are found in adolescent as well as adult populations.  
6 These findings emphasize the importance of taking into account the response timeframe used  
7 by researchers when considering past findings, and also in the design of future studies  
8 investigating mood. We conclude that mood assessments are influenced significantly by the  
9 response time frame used and recommend that researchers continue to investigate the  
10 temporal issues of mood assessment. Given that the present investigation was conducted  
11 primarily in single-sex schools and the participants were almost all males, the generalisability  
12 of the present findings to females is unknown. Replication of the present study among a  
13 female population might provide the focus of a future investigation.

14

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1 Table 1

2 *Daily Mood Assessments among 135 Schoolchildren*

Scale	Day 1		Day 2		Day 3		Day 4		Day 5	
	M	SD	M	SD	M	SD	M	SD	M	SD
Anger	51.93	11.59	50.70	11.64	52.25	14.16	50.11	10.14	48.65	8.39
Confusion	47.01	6.56	47.42	8.55	45.84	5.79	46.41	6.87	45.37	5.92
Depression	49.09	8.98	49.02	9.12	49.42	9.16	48.04	7.53	46.33	6.13
Fatigue	53.49	11.85	48.66	10.62	50.31	11.70	50.01	10.74	47.44	10.32
Tension	47.33	6.55	47.39	7.13	46.15	6.60	46.56	6.74	45.17	5.86
Vigor	49.06	10.75	48.64	10.08	46.79	9.31	46.92	9.87	48.33	10.53

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1 Table 2

2 *Comparison of “Past Week” and Mean “Right Now” Mood Assessments among 135*3 *Schoolchildren*

Scale	“Right Now” Mean		“Past Week”		$F_{1,134}$	$\eta^2$
	$M$	$SD$	$M$	$SD$		
Anger	50.72	8.04	53.74	11.70	13.81**	.09
Confusion	46.41	4.88	47.71	7.68	6.58**	.05
Depression	48.38	6.15	50.48	9.99	8.50*	.06
Fatigue	49.98	8.44	54.75	12.05	35.64**	.21
Tension	46.52	4.93	48.42	8.56	12.17**	.08
Vigor	47.95	7.41	51.77	11.01	24.02**	.15

4 *Note. Wilks’  $\lambda_{6,128} = .72, p < .001; \eta^2 = .28$* 5 \*  $p < .05$ , \*\*  $p < .01$

1 Table 3

2 *Beta Weights ( $\beta$ ) to Predict “Past Week” Mood from Daily “Right Now” Assessments among*3 *135 Schoolchildren*

Time	Mood Scale					
	Anger	Confusion	Depression	Fatigue	Tension	Vigor
Day 1	.17	.06	.11	.18*	.35**	.11
Day 2	.25*	.16	.11	.33**	.14	.04
Day 3	.13	.11	.02	.01	.00	-.03
Day 4	.08	.18	.19	.16	.11	.26**
Day 5	.27**	.38**	.37**	.17	.32**	.37**
Adj $R^2$	.36	.45	.37	.41	.50	.36

4 \*  $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$

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