

EFFECT OF INTERVAL BETWEEN TWO ESTIMATION TECHNIQUES ON THE SIMILARITIES AND DIFFERENCES AMONG ANGER AND DISGUST

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ABSTRACT

The present study was designed to center around emotion measurement issues by line number estimations techniques and the relationship of anger and disgust emotions with appraisal dimension. Study made an attempt to identify the interval (0 interval and 24 hours interval) and emotion effect on line, number estimations. Data were collected from the U.G. students; subject has to respond on their past emotional experiences on the basis of appraisal dimension, by line and number estimation techniques. In-depth interview with respondents' generated descriptive data. The data were analyzed with the help of multivariate analysis of variance (MANOVA). In the present study effect of interval was found on appraisal dimension and line, number estimations. In emotions disgust shows higher differences in comparison to anger. The present study also found the one type of interaction effects between interval x emotion. The findings of study have important implications for the measurement of emotions that how emotion measure in a better way by the magnitude scale. The research also shows the relationship of emotions with the appraisal dimensions.

KEYWORDS: Appraisal Dimensions, Anger, Disgust and Magnitude Estimation

INTRODUCTION

Emotion is a complex psychophysiological experience of an individual's state of mind as interacting with biochemical (internal) and environmental (external) influences. In humans, emotion fundamentally involves "physiological arousal, expressive behaviors, and conscious experience." Emotion is associated with mood, temperament, personality – disposition, and motivation. Motivations direct and energize behavior, while emotions provide the affective component to motivation – positive or negative.

Emotions are rooted in appraisals. At the most general level, *emotion appraisals* involve evaluative judgments of whether an event is good or bad and whether people's current actions and environment correspond to their personal goals and expectations (Carver & White, 1994; Davidson, 2004; Higgins, 1997; Russell, 2003). The study of emotion - eliciting appraisals, or the "meaning making" processes that give rise to different emotions (Clore & Ortony, 2008; Roseman, 1991, 1984; Roseman, Spindel, & Jose, 1990; Roseman, Wiest, & Swartz, 1994; Scherer, 1997; Scherer & Wallbott, 1994; Smith & Ellsworth, 1985), was the intellectual offspring of two literatures: (1) research on stress and health, particularly Lazarus' (1991) reframing of specific stresses as emotion appraisals, and (2) the study of attribution, achievement motivation, and emotion (Weiner, 1985) and its documentation that successes and failures could lead to different emotions depending on how outcomes are interpreted.

Discrete approaches to emotion appraisals focus on the coherent themes, or *core-relational themes* in Lazarus's words (1991) that give rise to the experience of emotions and that differentiate emotions from one another. *Discrete approaches to appraisal* help to illuminate sources of individual variation in emotion — for example, why an angry person appraises ongoing events in ways that lead to a life rife with frustration and hostility (Rosenberg, 1998). Discrete emotion-eliciting appraisals can be captured in spontaneous discourse and relate to emotion-specific experiences and facial expressions (Bonanno & Keltner, 2004). Yet discrete approaches to appraisal fail to yield simple explanations of the similarities among emotions (e.g., between anger and fear) and do not readily explain rapid transitions between emotional states (Ellsworth, 1991).

By *dimensional approaches to appraisal* presuppose that core dimensions of appraisal, when combined, give rise to specific emotions (e.g., Ellsworth & Smith, 1988; Smith & Ellsworth, 1985). In their review of numerous studies of the semantic content of emotions, Smith and Ellsworth (1985) derived eight dimensions that capture the appraisal processes that lead to various emotions (see also Scherer, 1997). These appraisal dimensions can be thought of as the basic units of meaning that people ascribe to events.

Guided by dimensional approaches, studies of emotion-related recall (Ellsworth & Smith, 1988; Smith & Ellsworth, 1985) have documented that each emotion is defined by a fairly distinct pattern of appraisal (for critiques of this methodology, see Parkinson & Manstead, 1992). For example, interest is associated with appraisals of increased pleasantness, the desire to attend, the sense that situational factors are producing events, a perceived need to expend effort, moderate certainty about future outcomes, and little sense of obstacles or the illegitimacy of events.

Dimensional accounts of emotion appraisal have generated several lines of inquiry. These accounts identify mechanisms by which emotions influence different cognitive processes and pinpoint likely emotional processes associated with different central nervous system regions (Davidson, Pizzagalli, Nitschke, & Kalin, 2003; Ochsner, 2008). For example, the experience of anger involving high levels of agency has been associated with activation in the left-frontal regions of the cortex, an area of the brain thought to facilitate approach-related behavior (Harmon-Jones, Sigelman, Bohlig, & Harmon-Jones, 2003). Dimensional accounts also illuminate likely areas of cultural variation in emotion-related appraisals. For example, based on how cultures vary in their conceptions of human agency (Morris & Peng, 1994), similar events are likely to trigger different emotions in members of different cultures, probably because of differences in appraisal.

Discrete and dimensional approaches both assume that emotion-eliciting appraisals begin with simple appraisals and proceed to complex meaning-making attributions. Along these lines, a critical question that has emerged concerns *automaticity*: which emotion-eliciting appraisals are automatic — that is, fast, beyond deliberative control, and preconscious, that is, immediate; and which are more deliberative, controlled processes. Inspired by Zajonc's theorizing (1980), researchers now widely assume that an automatic, preconscious appraisal produces an evaluation of whether a stimulus is good or bad (LeDoux, 1996; Mischel & Shoda, 1995; Russell, 2003; Winkielman, Zajonc, & Schwarz, 1997). This system gives rise to automatic affective reactions that motivate rapid approach or avoidance responses and core feelings of positivity or negativity (Barrett, 2006; Russell, 2003).

The literature on emotion appraisals is rich in theoretical development, but several areas of inquiry await empirical attention. Given critiques of self-report measures as assessments of online appraisals (Parkinson & Manstead,

1992), methods are needed to study the contents of appraisal processes as they occur. In addition, new questions have arisen concerning the semantic content of primary appraisals: Are primary appraisals attuned to the valence of a stimulus, its novelty, its salience, or its intensity? Are Attention, Certainty, Control, Pleasantness, Perceived obstacle, Legitimacy, and Anticipated effort dimensions, involved in automatic, primary appraisals? How can we measure the emotions? Is there any relation between emotions on different dimensions? Can discrete emotions be generated through automatic appraisals? To what extent do primary appraisals give rise to conscious experiences (Clore & Ortony, 2008; Winkielman, Knutson, Paulus, & Trujillo, 2007)? Answers to these questions will shed light on how emotions arise.

METHODS

Type of Research and Design

It is an exploratory experimental study using 2X2 MANOVA design. There are two IV's and two DV's.

Participants

The sample consisted of 120 undergraduate college students, of The Lalitpur city (U.P.) randomly assigned in two treatment conditions, 60 students were randomly assigned to each treatment condition. The sample is divided into two groups on the basis of conditional time duration. Sixty students are taken for no interval condition, and same number are for interval (approximately 24 hours) condition.

Procedure

For recording subject's responses they were given NEMT Test paper (Negative Emotions Measurement Test) it has two response pages for each emotion, each page for one emotion and eight appraisal dimensions. For two emotion subject are given two response pages. On each page subject has two estimates of an emotion on a particular dimension by using line estimation and number estimation. The reference line is 5 cm and reference number is 50 are given in page. Subjects were asked to estimate the magnitude of each dimension by drawing the line whose length is equal to the magnitude. In the same way subject has to give number which is assumed to be equal to the magnitude on a dimension.

Instructions

To make the subject acquainted with the task an exemplar of actual stimulus-response cards used in actual study, stimulus is presented to him/her. In Emotion word sheet, as you can see it is an appraisal dimension word. This word tells something about when you engage in any activity or experience. In other words, this is one characteristic of your experience. The meaning of the word will be clear to us when we read the meaning given after it."

In Test paper, the reference line and reference number is given; you have to response according to those. In line if you feel this emotion on this dimension double than draw a 10 cm. line, if four time more than 20 cm. line or feel half of reference line than 2.5 cm line and so on. In number 50 is reference as line in number also you have to response according to reference number if you feel double than write 100, if feel four time more than write 200, if feel half then 25 and so on. There for, responses will be $2 \times 2 = 04$ numbers of estimates on 8 dimensions with 2 type of responses line and number.

Data Collection

For collecting the data, two groups selected randomly each group have 60 subjects. A verbal consent was taken from the respondents after informing them the purpose of the study. They were assured that the information they provide

will be kept confidential and used only for research purposes. Each subject was briefly interviewed to find out whether they met the criteria for inclusion in the sample. Thus a sample of 120 respondents aged between 18 to 22 years was selected. They were then handed over emotion and dimension written response pages to respond. They were helped if they had any difficulty regarding understanding or responding to the response pages items. Respondents were requested to respond honestly and to answer all the items. After they had completed all items they were thanked and the complete questionnaires were collected.

Hypothesis

H.1: In comparison to the interval condition there will be more similarity between Line and Number estimates in no interval condition.

Question-A: Does the interval between the two estimations produce differences between the Line and Number estimations?

H.2: Anger and disgust will not be differentiated on four dimensions – attention, certainty, control, pleasantness, perceived obstacle, responsibility, legitimacy, and anticipated effort.

RESULTS AND DISCUSSIONS

SECTION – I

Descriptive Statistics

Table 1 shows the means and SDs of interval on each dimension, table 2 has means and SDs based on subjects' estimations of different emotions on different dimensions using line and number.

Table 2: Mean and SD of Interval on Line and Number Dimensions

I		D1 L	D1 N	D2 L	D2 N	D3 L	D3 N	D4 L	D4 N	D5 L	D5 N	D6 L	D6 N	D7 L	D7 N	D8 L	D8 N
I 1	M	6.6 8	53. 59	5.0 7	43. 73	5.1 0	46.7 9	1.8 1	13.6 7	6.5 5	52.2 3	5.4 3	43.9 7	5.9 3	51.3 8	6.7 4	61.9 3
	S D	7.2 8	56. 87	4.1 7	39. 70	4.3 7	48.8 9	2.7 9	20.2 5	5.1 1	37.7 0	5.5 6	46.9 4	5.5 6	52.9 9	5.2 2	67.8 9
	N	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120
I 2	M	4.9 6	45. 09	4.5 6	40. 70	4.6 3	46.4 0	2.0 0	17.8 9	5.4 4	49.9 2	4.4 0	37.1 4	5.3 1	46.0 4	5.1 8	50.4 3
	S D	2.9 6	32. 42	3.0 8	30. 72	3.4 7	55.5 8	2.6 5	29.6 8	3.7 7	42.9 3	2.8 7	29.9 4	3.9 5	41.7 2	3.6 0	44.5 2
	N	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120
Tot al	M	5.8 2	49. 34	4.8 2	42. 21	4.8 7	46.6 0	1.9 0	15.7 8	5.9 9	51.0 8	4.9 1	40.5 5	5.6 2	48.7 1	5.9 6	56.1 8
	S D	5.6 1	46. 39	3.6 7	35. 45	3.9 4	52.2 4	2.7 1	25.4 4	4.5 1	40.3 3	4.4 4	39.4 4	4.8 2	47.6 7	4.5 4	57.5 8
	N	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240

Table 1: Mean and SD of Emotions on Line and Number Dimensions

E		D1 L	D1 N	D2 L	D2 N	D3 L	D3 N	D4 L	D4 N	D5 L	D5 N	D6 L	D6 N	D7 L	D7 N	D8 L	D8 N
E 1	M	5.4 0	43. 10	5.0 1	44. 92	4.2 0	39. 88	1.3 9	10. 18	5.5 0	48. 96	4.4 3	38. 39	5.3 4	47. 26	5.2 8	46. 83
	S D	3.9 3	31. 63	3.6 0	36. 55	3.0 0	44. 38	2.5 0	17. 62	3.6 8	34. 22	3.6 6	41. 07	4.3 1	46. 11	4.4 2	45. 02
	N	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120
E 2	M	6.2 4	55. 58	4.6 3	39. 51	5.5 3	53. 32	2.4 2	21. 38	6.4 9	53. 19	5.4 0	42. 72	5.9 0	50. 17	6.6 4	65. 53
	S D	6.8 9	56. 94	3.7 3	34. 26	4.6 2	58. 47	2.8 4	30. 43	5.1 8	45. 68	5.0 8	37. 78	5.2 8	49. 32	4.5 7	66. 75
	N	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120	12 0	120
Tot al	M	5.8 2	49. 34	4.8 2	42. 21	4.8 7	46. 60	1.9 0	15. 78	5.9 9	51. 08	4.9 1	40. 55	5.6 2	48. 71	5.9 6	56. 18
	S D	5.6 1	46. 39	3.6 7	35. 45	3.9 4	52. 24	2.7 1	25. 44	4.5 1	40. 33	4.4 4	39. 44	4.8 2	47. 67	4.5 4	57. 58
	N	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240	24 0	240

These tables present the context in which the differences between emotions will be analyzed statistically in section – II.

This research needs MANOVA which is relatively complex processing of these primary characteristics of the data, the researcher has tried to state some hypotheses regarding the effect of Interval, Emotions, and their combined effects on dimensional estimations of emotions. The problem of hypothesis formation became almost impossible due to non-availability of researches related with the interval between of line and number estimation.

SECTION – II

Multivariate Analysis of Variance (MANOVA)

A Multivariate Analysis of Variance was conducted to explore the impact of two negative emotions with interval on the evaluation of the eight appraisal dimensions. The evaluation of the appraisal dimensions was measured by two dependent variables-line and number.

Table 3: MANOVA Significant Result (Interval X Emotion/ N=120)

	Interv al	Emotio n	Interva l x Emotio n
Pillai's Trace	-	.004*	-
Wilks' Lambda	-	.004*	-
Hotelling's Trace	-	.004*	-
Roy's Largest Root	-	.004*	-

Table 3 Shows the main and interaction effect of interval, and emotion, the main effects of the emotion is significant (at $p < .05$) in all test statistics. And the effect of interval is not significant in any test. All the test statistics- Pillai's Trace, Wilks' Lambda, Hotelling's Trace, Roy's Largest Root show no significant effect of Interval x Emotion.

Between Subject Effects

This part of result contains the summary table for the dependent variables. There are two parts in between subject result first is main effect and second is interaction effect of IVs. The main effect and interaction effects are given blow.

Table 4: Significant Differences Of Between Subject Effect Interval X Emotion/N=120

	Interval	Emotion	Interval x Emotion
D1L	.018*	-	-
D1N	-	.037*	-
D2L	-	-	-
D2N	-	-	-
D3L	.-	.009*	-
D3N	-	.046*	-
D4L	-	.003*	.040*
D4N	-	.001*	.047*
D5L	-	-	-
D5N	-	-	-
D6L	-	-	-
D6N	-	-	.012*
D7L	-	-	-
D7N	-	-	-
D8L	.007*	.018*	-
D8N	-	.011*	-

MAIN EFFECT

Interval

Table 4 Shows the between subject effect, the main effect of the interval with different dimensions. In D1L (MS=176.474, F=5.703 and $p < .05$), and in D8L MS = 144.771, F = 7.325 and $p < .05$).

In these tables, it can be observed that the difference between no interval and interval condition are positive for only two line estimation. Overall trends in both tables is that under interval condition (with 24 hours gap), the mean scores tend to be lower than no interval condition. Interval the factor which can be considered as aspect of estimation process.

There are two modes of estimations Line and Number. Each subject has to use these modes. Resultantly the question of interval between of the two modes is natural. This factor is the aspect which is affected upon the estimation process. However, it should also be taken as truism that dimensions are related to the aspect of emotions. Any deviation of mean score may be attributed by the cognitive factors qualified with the emotion dimension relationship.

Emotion

Table 4 shows the Emotion main effect. There are seven significant differences on different dimensions. D1N (MS=9350.017, F=4.413 and $p < .05$), and in D3L MS = 105.470, F = 6.943 and $p < .05$, D3N (MS= 10840.704, F= 4.011 and $p < .05$), and in D4L MS = 63.037, F = 8.933 and $p < .05$, D4N (MS= 7515.204, F= 12.347 and $p < .05$), and in D8L MS

= 112.067, $F = 5.670$ and $p < .05$), D8N ($MS = 21000.104$, $F = 6.499$ and $p < .05$).

Interaction Effect

There is one types of interactions found in the study. The question the researcher must ask whether the statistically significant interactions are psychologically significant too. The problem is to verify the isomorphic relations between the statistical significant and psychological significance. Let this relationship be examined. This examination would be based on the trends within data generated by IVs, separately. The factor-wise trends are given below;

Interval Factor: Includes negative trend, this is when there is no interval between two estimation techniques (Line and Number). The score are higher than the condition when there is interval between the two.

Interval X Emotion

Table 4 shows the interaction of interval x emotion. There is only three significant difference in D4L ($MS = 30.104$, $F = 4.266$ and $p < .05$), D4N ($MS = 2425.704$, $F = 3.985$ and $p < .05$), and D6N ($MS = 9766.504$, $F = 6.438$ and $p < .05$).

SECTION-III

Pairwise Comparison

This part of result contains the post- hoc Bonferroni pairwise comparison summary table for the dependent variables. There are three parts in pairwise result first is interval pairwise comparison, second is gender pair wise comparison and third is emotion pair wise comparison of IVs on DVs. The pair wise comparisons are given below.

Interval Pair Wise Comparison

Table 5 shows the post-hoc comparison using the Bonferroni revealed significant differences between no interval and interval condition.

Table 5: Significant Differences in Interval Pair Wise Comparison

	I 1	I2
D1L	.018*	-
D1N	-	-
D2L	-	-
D2N	-	-
D3L	-	-
D3N	-	-
D4L	-	-
D4N	-	-
D5L	-	-
D5N	-	-
D6L	-	-
D6N	-	-

D7L	-	-
D7N	-	-
D8L	.007*	-
D8N	-	-

*Significant at .05 level

There are two significant differences on D1L (MD = 1.715, SE = .718, $p < .05$), and D8L (MD = 1.553, SE = .574, $P < .05$). This result shows the effect of no interval is higher than interval condition. The question and hypothesis addressed the interval effect on line and number production. The hypotheses and question were the following.

H.1: In comparison to the interval condition there will be more similarity between Line and Number estimates in no interval condition.

Question- A. Does the interval between the two estimations produce differences between the Line and Number estimations?

These findings are in opposition of our hypothesis concerning the Interval conditions. Hypothesis stated that the interval between the two response measures on eight dimensions will produce significant differences between the two measures because;

A. Interval provides an opportunity for intervening variables, such as respondent's mental state, depth of processing of before-interval estimation and affecting the after-interval estimation, etc.

B. Emotional state of the respondent's mental state might change from before interval and after interval conditions;

There are more significant differences in no interval condition (2 in all) in comparison to the interval condition. Out of 2 significant differences both differences are between line estimations.

Emotion Pair Wise Comparison

Table 6 Shows the Post-hoc comparison using the Bonferroni revealed significant differences between emotion (Anger and Disgust).

There are seven significant differences on D1N (MD = 12.483, SE = .5943 $p < .05$), D3L (MD = 1.326, SE = .503, $p < .50$), D3N (MD = 13.442, SE = 6.712, $p < .50$), D4L (MD = 1.025, SE = .343, $p < .05$), D4N (MD = 11.192, SE = 3.185, $p < .05$), D8L (MD = 1.367, SE = .574, $p < .05$), and on D8N (MD = 18.708, SE = 7.339, $p < .05$). These findings show that the emotion condition affects the subject responses.

Table 6: Significant Differences of Emotion Pair Wise Comparison

	E1	E2
D1L	-	-
D1N	-	.037*
D2L	-	-
D2N	-	-

D3L	-	.009*
D3N	-	.046*
D4L	-	.003*
D4N	-	.001*
D5L	-	-
D5N	-	-
D6L	-	-
D6N	-	-
D7L	-	-
D7N	-	-
D8L	-	.018*
D8N	-	.011*

*Significant at .05 level

Emotion Pair Wise Comparison

In emotion pair wise comparison there are seven significant differences and all differences found in disgust. In the following section, the developed hypothesis will be tested. The hypothesis was the following.

H.2 Anger and disgust will not be differentiate on all eight dimensions – attention, certainty, control, pleasantness, perceived obstacle, responsibility, legitimacy, and anticipated effort.

These findings are in opposition of our hypothesis concerning the disgust emotion in comparison to anger.

SECTION – IV

DISCUSSIONS

The present study was designed to center around negative emotion measurement issues by line number estimations techniques and the relationship of emotion with appraisal dimension. Study made an attempt to identify the interval (0 interval and 24 hours interval) and emotion effect on line, number estimations.

Data were collected from the U.G. students; subject has to respond on their past negative emotional experiences on the basis of appraisal dimension, by line and number estimation techniques. In-depth interview with respondents' generated descriptive data. The data were analyzed with the help of statistical tools.

In the present study effect of interval and emotion were found on appraisal dimension and line, number estimations. Negative emotion was inversely proportional to all variables. Differences are found in interval and emotion, two differences are found in no interval condition. And in emotion condition there are seven differences found on different dimensions.

The present study also found the three types of interaction effects, were significant for some variables, such as interaction effect of interval x emotion significant for D4L, D4N, D6N, D5L.

The study also examined the post-hoc Bonferroni pairwise comparison among IVs. There are two types of pair wise comparison; in it the significant result shows their inter-relation and differences in between IVs and DVs. In interval pairwise comparison no interval shows the higher differences comparison to interval condition. And in Emotion pairwise comparison, there seven significant differences and all differences found in disgust emotion on different dimensions.

CONCLUSIONS

The present study was designed to center around negative emotion measurement issues by line number estimations techniques and the relationship of emotion with appraisal dimension. Study made an attempt to identify the interval (0 interval and 24 hours interval) and emotion effect on line, number estimations.

Data were collected from the U.G. students; subject has to respond on their past negative emotional experiences on the basis of appraisal dimension, by line and number estimation techniques. In-depth interview with respondents' generated descriptive data. The data were analyzed with the help of statistical tools.

In the present study effect of interval and emotion were found on appraisal dimension and line, number estimations. Differences are found in interval and emotion, two differences are found in no interval condition. Emotion condition also too much effective for the subject responses. In emotion condition, higher differences are found in disgust condition.

The present study also found the three types of interaction effects, were significant for some variables, such as interaction effect of interval x emotion significant for D4L, D4N, D6N.

The study also examined the post-hoc Bonferroni pairwise comparison among IVs. There are two types of pairwise comparison; in it the significant result shows their inter-relation and differences in between IVs and DVs. In interval pairwise comparison no interval shows the two differences comparison to interval condition. In emotion condition, disgust condition shows higher differences comparison to anger condition.

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