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AUTHOR Goetz, Ernest T.; And Others
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ABSTRACT

A study examined the utility of latent partition analysis for describing the structure of emotional responses in reading. Subjects in the first experiment, 40 undergraduate university students, read a 2,100-word story and then immediately reported any scenes or events that evoked an emotional response and any mental images they recalled from reading the story. Sixty-nine affect terms were then identified for the latent partition analysis. Subjects in the second experiment, 53 undergraduates who had not read the story, were presented with a deck of 69 randomly ordered cards, each containing one of the emotional response terms reported by the students from experiment one. The sorters were then told to divide the cards into different piles representing categories of terms that were similar in meaning. The word sorts were subjected to a factor analysis. Results indicated that the factors identified through latent partition analysis by an independent group of sorters proved useful in interpreting readers' emotional responses to a story. Findings suggest that readers call on their background knowledge of emotional responses during reading and that free reports can provide a rich source of information about readers' emotional experiences that can be reliably coded and meaningfully interpreted. (Four tables of data are included.) (RS)

The Structure of Emotional Response in Reading: Quantitative and Qualitative Analyses

Ernest T. Goetz

Mark Sadoski

Arturo Olivarez, Jr.

Ayxa Calero-Breckheimer

Pamela Garner

Texas A&M University

Running Head: Structure of Emotional Responses

The Structure of Emotional Response in Reading: Quantitative and Qualitative Analyses

In recent years, our notion of the nature of reading has been expanding dramatically. Once it was argued that it was appropriate to conceptualize reading as a narrow, bottom-up process comprised of decoding and literal comprehension. More recently, however, the importance of inferential processes and of the readers' background knowledge in constructing a coherent, meaningful representation has been generally acknowledged. The present investigation was undertaken from the perspective that when readers encounter a literary text, their experience extends beyond decoding and literal comprehension of the words present. Elaborative or constructive processes are necessary to make sense of what is being read. Imaginative processes, including imagery and emotional response, are necessary to breathe life into the reading experience.

Although a great deal of research has been directed at decoding and literal comprehension, and much has been made of the importance of constructive or elaborative processes, relatively little attention has been directed to the imaginative processes of imagery and emotional response. Deiner and Iran-Nejad (1986) investigated emotional responses of readers to short mystery stories using bipolar rating scales for selected emotional adjectives to investigate the relationship between positive and negative affect. Sadoski and Goetz (1985) and Sadoski, Goetz, and Kangiser (1988) had readers rate the strength of their emotional responses to story paragraphs and investigated the

relationship of affect ratings to those for imagery and for importance to the story. In the present study, a free report methodology was used to collect readers' descriptions of emotional responses, and latent partition analysis methodology was used to examine the structure underlying these reports. The objectives of the present study were: (1) to examine the utility of latent partition analysis as a means of describing the underlying structure of the affective terms in the free report of emotional responses of readers of a literary text, and (2) to compare the resulting structure to those found using adjective checklists and other methodologies (e.g., Daly, Lancec, & Polivy, 1983; Gotlib & Meyer, 1986).

Method

Identification of Affect Terms (Experiment 1)

The data source for the present investigation was a set of free report protocols for readers' emotional responses to a literary text. Forty undergraduate university students read a 2100 word story and then immediately reported any scenes or events that evoked an emotional response and any mental images they recalled from reading the story. Emotional response and imagery reports were conducted in counterbalanced order. The story, titled "First Kill", was an excerpt from the adolescent action novel Buffalo Chief (Annixter & Annixter, 1958), which is summarized in Table 1. In this story, Hawk, a Sioux Indian youth, fulfills the rite of passage to hunter by single-handedly killing his first buffalo. Examination of readers' protocols, in which readers were asked to list separately and number each story event

that elicited an emotional response, revealed an average of 5.8 emotional response reports per subject (range = 1-15). Identification of key words describing the emotional responses, including different forms of the same root (e.g., anger, angry; anxiety, anxious), yielded an initial list of 95 terms. After eliminating duplication of the same root, 69 affect terms were identified for the latent partition analysis.

Insert Table 1 about here

The 69 affect terms were used a total of 314 times in readers' affect report protocols. Each occurrence of an affect term was coded for the story episode to which it related. Of the 314 occurrences, 166 were successfully identified with a single story episode; the remainder were indeterminate with respect to story episode or referred to events that spanned two or more episodes. The relative frequency, summed across all affect terms, of each story episode is presented in Table 1. In addition, the readers use of first person (e.g., "I felt...") or third person (e.g., "Hawk was...") was identified for 175 occurrences of the affect terms. Reliability of both coding decisions was above .9 (proportion of interrater agreement).

Latent Partition of Affect Terms (Experiment 2)

Latent partition analysis was developed by Wiley (1967) and generalized by Evans (1970a, 1970b) as a procedure for examining the structure of freely categorized data. The technique produces a multidimensional representation of the way students have

organized, or sorted, the data using factor analysis. The key assumption of this technique is that there is a set of unobservable or "latent" categories underlying the sortings of individual students. Latent partition analysis provides an efficient way of deriving the latent categories from the actual, or observed, sortings of the students (for a full review of the method and its current applications, see Miller, Wiley, & Wolfe, 1986).

The latent partition analysis in this study was based on the sorting responses of a different group of 53 undergraduates. Each sorter was presented with a deck of 69 randomly ordered cards, each containing one of the emotional response terms reported by the students who read the story. The sorters were told to divide the cards into different piles representing categories of terms that were similar in meaning. The number of the categories to be used was left open, except that categories with a single term were discouraged. After finishing their task, the sorters separated the different categories using blank cards of a different color. Sorters were asked to write a name or description for each of their categories on the blank cards. The word sorts were then subjected to factor analysis to determine the latent categories, or factors.

Results

Principal-components factor analysis with varimax rotation yielded sixteen factors with eigenvalues greater than 1.0. Together, these factors accounted for 69.5% of the total variance. The large number of factors identified reflected the

large number of categories used by individual sorters: sorters used an average of 10.6 piles (median=11), with some sorters using as many as 22 piles.

As shown in Table 2, when a factor loading greater than 0.5 was used to assign terms to factors, 65 of 69 terms were uniquely assigned to a single factor (the remaining terms did not reach a factor loading of 0.5 for any of the 16 significant factors). Thus, the latent partition analysis provided a taxonomy of affect terms that revealed a complex underlying structure for readers' emotional reactions.

Insert Table 2 about here

Eleven of the factors had one or more loadings of .8 or above but not more than three loadings of .8 or above, and fourteen of the factors had one or more loadings of .7 or above but not more than five loadings at .7 or above. Virtually all of these factors were clearly identifiable as a specific emotional state that was derived from the subjects' sortings and could readily be associated with sections of the original story. Using the highest loadings as guides for interpreting the factors, two major factors that accounted for more than 10% of the variance each were "uncertainty" and "sadness." Two other factors, "happiness" and "anger", each accounted for between 5% and 10% of the variance. The remaining factors accounted for less than 5% each, but could be readily interpreted from unique high loadings. Examples of these factors are "bravery," "satisfaction," "fear," and "modesty."

The utility of the latent partition analysis factors in describing and interpreting the original readers' affect protocols is illustrated in Tables 3 and 4. As shown in Table 3, different story episodes evoked different emotional responses in a manner that is captured by the latent partition analysis categories. For example, at the beginning of the story, readers reported uncertainty (Factor 1) about Hawk's eventual success. Readers reported being afraid (Factor VIII) when Hawk was caught in the buffalo herd attempting to kill his bull; they remarked on Hawk's bravery (Factor V) from his stabbing of the bull through the ceremony in his honor that ends the story. Episode 3, the climax of the story, which produced the most affect response terms (Table 1), also produced the greatest variety of affective reactions in terms of the factors represented (Table 3).

Insert Tables 3 & 4 about here

Interestingly, Factor V proved unique in readers' use of affect terms. Overall, and for all other affect terms and latent partition analysis categories, readers tended to use the first person (e.g., "I felt..."). However, as shown in Table 4, for each term in Factor V, use of the third person (e.g., "Hawk was...") predominated. In other words, readers were inclined to report that they (rather than a story character) experienced feelings of doubt, sadness, happiness, or anger. Feelings such as courage and confidence, however, more often were ascribed directly to the story character.

Discussion

In interpreting the results of the present investigation, it is important to remember that the sorters of the latent partition analysis (Experiment 2) had seen neither the original story nor the affect report protocols of the students who read it (Experiment 1). The fact that the factors identified through latent partition analysis by an independent group of sorters proved useful in interpreting readers' emotional responses to a story suggests that readers call on their "background knowledge" of emotional experiences during reading. The results also suggest that free reports can provide a rich source of information about readers' emotional experiences that can be reliably coded and meaningfully interpreted.

It is also of interest to contrast the results of the latent partition analysis reported here with previous investigations of the structure of affect. For example, Gotlib and Meyer (1986) submitted the responses of 475 undergraduates on the 132 item Multiple Affect Adjective Checklist (MAACL; Zuckerman & Lubin, 1965) to factor analysis. Similar to the present study, they initially identified 20 factors with eigenvalues greater than 1.0. They settled, however, on two large unipolar factors: positive and negative affect. Gotlib and Meyer were interested in the validity of the MAACL as a clinical instrument for assessing anxiety, depression, and hostility. The present investigation suggests that if one's purpose is to describe readers' emotional experience (or, presumably, the emotional experiences of everyday life), then the additional detail

provided by the full set of factors identified does greater justice to the underlying richness and complexity of the experience.

As we stated at the outset, a complete understanding of the reading process awaits, in part, upon a better understanding of the imaginative elements of that experience, namely imagery and emotional response. Just as we would not want to call the activity of a student who has mastered decoding but lacks comprehension, "reading," it is equally inappropriate to ascribe true understanding to students who do not engage the constructive and imaginative processes necessary to bring the text to life. We believe that further investigations of readers' emotional responses can contribute to the development of a more complete understanding of the reading process which is so crucial to personal development and success in school in our literate society.

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Table 1

SUMMARY AND EPISODES
FIRST KILL

Episode	Summary	Relative Frequency (%) of Affect Terms
Setting	Hawk makes hunting arrows and a bow under the direction of Dead-Come-Back-Man.	3.6
Episode 1	Hawk realizes that the time has come to prove himself in the coming buffalo hunt. On the morning of the hunt, he retrieves his arrows from Dead-Come-Back-Man's tipi, selects his father's fastest horse, and waits on a hilltop for the hunt to start. The hunt begins and Hawk follows.	10.2
Subepisode 1	(begins subplot) When Hawk is first noticed, the hunting party tries to shame him away, but Hawk ignores them and they let him go.	10.8
Episode 2	On reaching the game, Hawk drives his horse into the thick of the herd. This panics his horse, which he calms by whispering to it. Hawk selects a young bull to kill and hits it with his first arrow. The buffalo rushes on, and Hawk pursues, shooting a second arrow which still fails to stop the animal.	9.0
Episode 3	Desperation at his inability to stop the bull, his fear of ridicule, and his knowledge of the pain the buffalo will suffer in a slow death cause Hawk to determine that he can't give up. Deciding to use his knife, he leaps onto the bull's back and stabs its throat. The bull still rushes on as Hawk whispers a ceremonial prayer. The bull finally falls, throwing Hawk.	27.7
Subepisode 2	(ends subplot) Hawk crawls close to the body to avoid being trampled by the herd. The hunting party arrives to find Hawk skinning out his kill by himself. He insists on doing so, even though this is usually a task for women.	8.4
Episode 4	At dusk, Hawk rides back to camp with the tongue, heart, and hide of his kill. His playmates hear of his feat and run to meet him. The girls and young women trill and sigh. Standing Elk, his father leads him on a ceremonial walk around the camp as he announces his new status. Horned Thunder, a war chief, praises Hawk. Hawk accepts the honor proudly.	21.1
Episode 5	That night there is feasting and a dance of Thanksgiving. Visitors come to Standing Elk's tipi to hear Hawk tell of the hunt. The eyes of the women in Hawk's family show their pride. Standing Elk shows his appreciation for the honors to his son by giving a horse to an elder. He gives Hawk the pony he rode in the hunt, but declines his privilege to rename his son.	9.0

Table 2

FACTOR LOADINGS (.50) FOR LATENT PARTITION
OF 69 AFFECT TERMS*

Item	Loading
Factor I (15.4%)**	
uncertainty	.85
unsure	.84
doubtful	.79
worried	.78
apprehensive	.76
nervous	.75
tension	.72
confused	.70
uptight	.69
frustrated	.66
anxious	.53
Factor II (12.1%)	
sorrow	.86
sad	.80
despair	.74
pain	.70
hurt	.67
anguish	.56
doom	.52
disappointed	.51
Factor III (7.2%)	
glad	.88
happy	.87
amused	.76
joy	.75
pleased	.72
excited	.52
Factor IV (5.3%)	
angry	.88
fury	.86
hate	.82
disgusted	.69
Factor V (3.9%)	
courageous	.87
brave	.87
confident	.71
determination	.64
proud	.53
Factor VI (3.8%)	
self-satisfaction	.90
self-fulfillment	.86
satisfied	.65
worth	.62

Item	Loading
Factor VII (3.2%)	
embarrassed	.85
humiliated	.78
foolish	.76
shame	.74
Factor VIII (2.9%)	
scared	.89
frightened	.88
fearful	.88
Factor IX (2.6%)	
interested	.80
curious	.75
challenging	.59
Factor X (2.4%)	
loved	.74
touched	.73
peaceful	.55
need	.54
Factor XI (2.1%)	
sympathetic	.84
empathy	.74
sorry	.63
Factor XII (2.0%)	
anticipation	.72
suspense	.67
Factor XIII (1.9%)	
respect	.71
impressed	.66
admired	.66
Factor XIV (1.8%)	
humble	.86
modest	.86
Factor XV (1.6%)	
encouraging	.61
hope	.56
Factor XVI (1.5%)	
shocked	.63

*Four terms of the 69 did not reach a loading of .5 on any of the 16 significant factors: enthusiasim, offended, patronizing, relieved.

**Variance accounted for by the factor. Total variance accounted for=65.9%.

TABLE 3

DISTRIBUTION OF AFFECT FACTORS BY STORY EPISODE*

Story Episode	Factors Represented
Setting	
Episode 1	I
Subepisode 1	I
Episode 2	VIII
Episode 3	II, III, IV, V, & VIII
Subepisode 2	V
Episode 4	III, V
Episode 5	V

*Total Frequency (across terms in the factor) $\geq$ 5 in readers' affect reports.

TABLE 4

DISTRIBUTION OF AFFECT TERMS BY PERSON (1ST OR 3RD): FACTOR V*

Affect Term	1st Person	3rd Person	1st & 3rd
courageous	0	3	0
brave	0	5	0
confident	6	7	1
determination	0	4	0
proud	10	20	2

*For all other factors and terms, 1st person predominated (Overall frequencies: 1st person, 106; 3rd person, 68; 1st &3rd, 11).