DISCUSSION

The present study demonstrates Ss' capacity to respond both to schematic categories and to levels of distortion within schemata. This finding supports previous research indicating that humans can employ probabilistic regularities as a basis for subjective categorization (Evans & Edmonds, 1966; Evans & Arnoult, 1967; Brown, Walker, & Evans, 1968). In addition, Ss appear sensitive to subgroupings defined in terms of pattern variability within schema clusters. Although the task was not designed to facilitate subjective scaling along a physical distance dimension, the correlation between subjective categorization and physical distance from prototype accounted for 55% of the variance. Ss' sensitivity to small differences in variability from a prototype as measured by PV appears to be acute. This conclusion is corroborated by Ss' performance in a free-sorting task employing VARGUS 7 stimuli.[2] It is noteworthy, however, that both the pattern example sheet and the instructions provided information about (1) the number of schemata present and (2) the hierarchical arrangement of patterns within schema. Although subjective classification of stimuli into the appropriate schema family and the correct redundancy level improved significantly over trials, the reliability of stimulus assignment on the 8-point scale was extremely high (.94) over the two halves of the task. These data suggest, therefore, that while Ss improved their ability to categorize stimuli according to variability levels, patterns retained their relative ordinal positions in terms of subjective categorization. It can be concluded, therefore, that improvement over trials was general in nature rather than specific to a particular level of distortion. A more finely graded response scale, however, would provide a more sensitive measure of possible changes in either sensitivity to variability or classification criterion as a function of schematic concept formation.

Failure to find a difference in the Phase 2 task as a function of the Phase 1 response requirement suggests that under the conditions of the present experiment overt responding neither facilitates nor impedes schematic classification.

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NOTES

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2. Bersted, C. T., Brown, B. R., & Evans, S. H. Free sorting with stimuli clustered in a multidimensional attribute space, unpublished manuscript.

The effect of stimulus intensity on induced crying activity in the neonate[1]

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Clinical observation indicated not only that infants are more responsive to a more intense painful stimulus, but that there are individual differences in the degrees to which their reactions are heightened. A systematic analysis of this differential in responsivity may provide an additional diagnostic parameter in the study of differences in crying behavior between normal infants and those with brain damage. For the normal infants studied here, the more intense stimulus produced a lustier cry, but latency was not affected.

In previous studies (Karelitz & Fisichelli, 1962; Fisichelli & Karelitz, 1963) designed to study the diagnostic potential of the cry in normal infants and those with diffuse brain damage, it was found that the normal infant generally responded more quickly and productively to painful stimulation than the brain-damaged infant. The stimulus was a snap of a rubber band on a gun-shaped apparatus against the sole of the foot. The stimulus, a No. 32 rubber band, and procedure are described in detail in the papers already mentioned.

The present study was designed to explore further the responsivity of normal infants to two stimuli differing in the strength of their impact force. While it may seem obvious that a more intense reaction will be obtained from a more painful stimulus, clinical observation reveals that infants differ in the degree to which their reactions are heightened. The differential in responsivity to two stimuli of varying intensity might provide an additional diagnostic parameter. Parmalee (1962), has already suggested that, among other things, "a 'good cry' . . . has a duration proportional to the degree of stimulation . . . ."

Preliminary findings in a test situation in which a "stronger" rubber band was applied after a "weaker" one indicated that reactions to the "stronger" were more severe than to the "weaker." It remained necessary to determine, however, that the more intense reaction was not merely a summative effect but unique to the "stronger" band. Evidence for this is already available since past observations with successive applications of the "weaker" stimulus do not show heightened responses. The present study proposes a more direct test of the issue and suggests an objective measure of the strengths of the so-called "weaker" and "stronger" stimuli.

METHOD

The stimuli used were rubber bands of different lengths, No. 32 and the shorter No. 30 of the Springline Parr Amber make. The No. 30 has more sting to it. Since neither the manufacturer nor their testing consultants could provide any quantitative specifications on the "strengths" of their products, the authors devised their own measure of the impact force of the bands. A plastic bottle, measuring 72 mm long, 48 mm wide, and 85 mm high, was filled with water so that the entire unit with cap weighed 150 g. This was placed on a stainless steel surface and the tip of the gun-shaped apparatus with band in cock position was placed against it. The band was released and

Table 1
Responses to More Painful Stimulus (No. 30 Rubber Band)

Name	Sex	Latency (Sec)	Total Sounds	Cumulative Time (Sec)	Total Time (Sec)
BE	F	1.7	36	45	55
FR	F	1.7	58	60	60
LE	F	2.5	94	60	60
LO	M	1.3	80	60	60
MA	F	2.1	14	23	28
MC	M	1.0	74	60	60
MO	F	1.1	58	58	60
SC	F	2.0	16	44	48
SI	M	1.5	18	45	58
TR	F	1.8	68	60	60
Means		1.67	51.60	51.50	54.90
SD		.44	27.40	11.73	9.68

Table 2
Responses to Less Painful Stimulus (No. 32 Rubber Band)

Name	Sex	Latency (Sec)	Total Sounds	Cumulative Time (Sec)	Total Time (Sec)
CH	F	1.9	7	9	9
CO	F	2.1	14	19	19
GL	M	2.5	8	10	10
LEE	F	1.5	54	43	46
LEV	F	1.5	16	17	33
MAL	F	.9	34	33	33
MCG	F	1.7	17	20	20
MAZ	M	1.5	5	8	8
SCH	M	C.D.*	29	22	22
ZA	F	N.R.**	0	0	0
Means		1.70	18.40	18.10	20.00
SD		.45	15.51	12.00	13.36

**C.D. = Can't determine. **N.R. = No response.*

its impact moved the bottle several millimeters from its original position. The distance moved is defined as impact force (IF).

For 10 different No. 32 bands, the mean IF was 4.2 and the SD was 1.2; for 10 No. 30 bands, the mean and SD were 6.2 and 1.0, respectively. The difference was significant beyond the .01 level ($t = 4.5$), With 10 tests of a single No. 32 and 10 tests of a single No. 30, the respective means and SDs were $4.0 \pm .6$ and $6.6 \pm .5$; the difference again was highly significant ($t = 9.7$). Two groups of normal infants, all 2 days of age, 10 in each group, were studied. The first group received the more painful No. 30 first, and if 60 sec of crying were not obtained it was followed by No. 32 no more than three times or until 60 sec of crying were obtained. The second group received No. 32 first followed by two more No. 32 and one more No. 30, as required. All sessions were recorded on magnetic tape.

RESULTS

Four measures of crying activity were obtained: (1) Latency—the time in tenths of a second from the moment of stimulation to the onset of the first vocalization. It is taken from Stimulus 1 only. (2) Total sounds—the number of sounds emitted during the crying period including bursts, whimpers, and gasps. (3) Cumulative time—the time actually spent in emitting sounds, but including breath-holding. (4) Total time—the time in seconds spent in crying (not more than 60 sec) including interruptions in the cry (lasting less than 10 sec). All measures were audited on tape by two independent auditors and represent the averages of the auditors.

The results and tests of significance reveal the following: latency—$t = .151$, n.s.; total sounds—$t = 3.162$, $p < .01$; cumulative time—$t = 5.964$, $p < .001$; total time—$t = 6.345$, $p < .001$; all two-tailed.

Within the limits prescribed by the conditions of this study, it is clear that the more intense pain produces a longer, more concentrated and more productive cry. Latency is not affected. Thus, the more intense pain produces a longer and more intense cry but it does not affect the speed of its onset. This finding, we feel, is most interesting since no one expected it, but all agree on hindsight that it makes sense. In any case, it has seminal value, both for further thought and research. We are currently gathering similar data for brain-damaged infants.

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NOTES

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