Educational levels and field-dependent/ field-independent perceptual style

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The Group Embedded Figures Test (GEFT; Witkin, Oltman, & Karp, 1971) was given to 483 subjects of different educational levels in France. The distribution of the subjects in the quartiles of the test scores related to the four educational levels shows ($p < .001$) that subjects of lower educational levels are likely to have lower scores on this test of perceptual and cognitive style, whereas subjects of higher educational levels are likely to have higher scores. We may conclude that schooling develops a more independent style of perception and thinking, with the corollary that independence may be trained. True dependents are those who present a dependent perceptual and cognitive style in spite of their university level. It is questioned whether a more independent style is necessary for the better problem comprehension.

According to Witkin, Oltman, and Karp (1971), the Group Embedded Figures Test (GEFT) is able to detect subjects' perceptual dependence on or independence of prominent stimuli surrounding a target, and their ability to break down the nonpertinent figure lines to isolate and identify the simple figures hidden in more complex patterns. Individuals' perceptual dependence or independence is linked to their ability to differentiate and is probably linked to early childhood dependence education. Females in general are more dependent than males, and children and the elderly (over 60 years of age) are more dependent than middle-aged adults. At about the age of 17, a person's perceptual style is becoming more defined, somewhat as a personality trait, defining the mode of perceiving and of problem solving. Independent persons rapidly see the hidden figures in the GEFT; these persons probably are more likely to detect cues pointing to dangerous situations and so probably are less likely to be involved in traffic and work accidents.

Huteau (1975), in his outstanding review of field-dependent/field-independent cognitive style, noted that a strong positive correlation had been verified between field independence and IQ. He also noted that the cross-cultural

studies by Berry (1966) verified that occidentalization, caused by urbanization and the development of schools, resulted in greater field independence in the two cultures studied by Berry: the Eskimos and the Temnes. But no systematic study of the influence of educational levels on field dependence/independence was mentioned.

Our hypothesis is that field-dependent/independent perceptual and cognitive style is influenced by the individual's educational level. Higher educational levels will develop in those who are not true dependents a more independent perceptual and cognitive style.

The present study was directly linked to research about field dependence/independence and traffic-accident involvement (Pottier, 1982; Pottier, Roquelaure, & Pottier, 1984; Rozestraten, 1980, 1981, 1982).

METHOD

Subjects

The total sample of 483 subjects comprised three groups. Group 1 ($n=98$) consisted of the personnel of the Laboratoire de Psychologie de la Conduite, some personnel and trainees of the Prévention Routière of the auto racetrack Linas-Montlhéry in France, and a group of biological researchers from the Collège de France in Paris. Group 2 consisted of 245 recruits from the Régiment de Marche de Tchad and the Régiment d'Artillerie de Marine in Montlhéry. Group 3 ($n=140$) consisted of drivers and administrative personnel of the Post Office, Telephone and Telegraph Centre of Paris. All of the subjects were male.

Instrument

All subjects were administered the GEFT in groups of approximately 20 subjects. After receiving brief instructions and two very simple problems to solve, they received more detailed instructions and a first section, A, with seven training figures to be solved within 2 min. After that, they received two sections, B and C, composed of nine figures each, with a time limit of 5 min per section. The total possible score was 18.

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Procedure

Before being tested, the subjects filled in their personal identification data, including their educational level. After this, a brief explanation was given about individual differences in the perception of simple figures embedded in more complex ones, but no reference was made to educational level. The subjects then inspected the eight simple figures and were informed that they did not have to memorize them and that they were allowed to return to these figures as many times as they wished during the test. Next, they read individually the first simple instructions and solved the two simple problems. After this, the experimenter read all of the instructions and answered any questions asked, so that the subjects had no doubt about their task. Then the subjects solved the seven training problems and the experimenter checked whether those problems were correctly solved and made corrections where necessary. Before starting the test proper (Section B), the experimenter asked whether there were any questions. If no questions were asked, the experimenter signaled the subjects to start solving the nine problems of Section B. After 5 min, all subjects stopped and again the experimenter asked whether there were any questions. If no questions were asked, he signaled the subjects to begin solving Section C. This procedure was followed to guarantee that there was no doubt about the task and that the scores really corresponded to perception differences and not to task comprehension.

RESULTS

The subjects were classified on the basis of their educational levels into four groups: (1) incomplete primary school level (4 years; $n=118$); (2) complete primary school level or professional school ($n=209$); (3) high school ($n=93$); and (4) university or technical high school ($n=63$).

The scores on the GEFT were divided into quartiles: Quartile 1, $n=114$; Quartile 2, $n=117$; Quartile 3, $n=129$; and Quartile 4, $n=123$. Table 1 shows the number of subjects at each educational level in each quartile, with the observed and expected frequencies.

Our hypothesis that the subjects' GEFT scores were dependent on their educational levels was tested by the chi-square test, which showed a significant dependence at the

$p < .001$ level. Higher educational levels produced more independent perceptual and cognitive style. Of the subjects at Educational Level 1, 82% were in Quartiles 1 and 2 (expected frequency [EF] = 47.8%); 60% of the subjects at Educational Level 2 were in Quartiles 2 and 3 (EF = 47.8%); 71% of the subjects at Educational Level 3 were in Quartiles 3 and 4 (EF = 52%); and 55% of the subjects at the university level (Educational Level 4) were in Quartile 4 (EF = 25.4%).

DISCUSSION

Our findings are clear and significant, and strongly suggest that higher educational levels produce a more independent perceptual and cognitive style. It is possible that training in mathematics, particularly in planimetry and geometry, has a positive effect on perceptual style. On the other hand, it is also clear that some individuals retain a highly dependent style regardless of their college and university studies. They are probably true dependents, resistant to independence training. We may hypothesize that between the extreme groups of highly dependent and highly independent subjects there is an intermediate group, which is probably sensitive to independence training. Training would develop higher independence in these subjects. It may be true that studies at the university level not only develop the quantity of memorized scientific matter in the student's brain, but also develop the capacity to solve problems, which may be the best result of university studies. On the other hand, it may be asked whether development of independent style is necessary for better problem comprehension.

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Table 1
Observed Frequency (OF) and Expected Frequency (EF)
of Subjects in the Quartiles of GEFT Scores as a Function
of Their Educational Level

Quartile	Educational Level							
	1		2		3		4	
	OF	EF	OF	EF	OF	EF	OF	EF
1	61	27.8	36	49.3	9	21.9	8	14.8
2	36	25.6	54	50.6	19	22.5	8	15.3
3	13	31.5	72	55.8	32	24.8	12	16.8
4	8	30.0	47	53.2	33	23.6	35	16.0
Total(OF)	118		209		93		63	