

Sensitivity to changing contingencies: A function of personality dispositions and instructions

(Sensibilidad a las contingencias cambiantes: una función de las disposiciones de personalidad y de las instrucciones)

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RESUMEN

Este estudio examinó los efectos que ejercen las disposiciones de personalidad y las instrucciones sobre la sensibilidad de los sujetos a las contingencias cambiantes en un programa múltiple. De acuerdo con los resultados obtenidos en la aplicación de una prueba de personalidad que medía "Rigidez" se seleccionaron 24 sujetos con calificaciones altas y 24 con calificaciones bajas. Todos los sujetos fueron expuestos a un programa de reforzamiento múltiple RDB4"/RF18. La mitad de los sujetos que calificaron alto o bajo en "rigidez" recibieron instrucciones precisas sobre el programa, la otra mitad recibió instrucciones mínimas. Después de dos sesiones de reforzamiento, el programa se sustituyó subrepticamente por uno de extinción. Los resultados mostraron que tanto las disposiciones de personalidad de los sujetos como las instrucciones afectaron la sensibilidad al programa. Los sujetos con calificaciones altas en "rigidez" mostraron significativamente menos sensibilidad a las contingencias cambiantes que los que obtuvieron calificaciones bajas en rigidez. Además, los sujetos que recibieron instrucciones precisas mostraron menos sensibilidad al cambio en las contingencias que los sujetos que recibieron instrucciones mínimas, lo que sugiere que la ejecución con instrucciones aparenta estar bajo el control del programa, pero de hecho está gobernada por reglas. Este estudio evidencia la utilidad que tiene evaluar las "disposiciones de personalidad" cuando se estudia la conducta humana en el laboratorio operante. Los repertorios conductuales prestablecidos que la gente trae consigo a la situación merecen ser tomados en cuenta, ya que no se pueden controlar con facilidad, ni tampoco se les puede eliminar, e interactúan significativamente con las variables independientes manipuladas durante el experimento.

Palabras clave: disposiciones de personalidad, conducta gobernada por reglas, instrucciones, sensibilidad al programa, programas múltiples, adultos humanos.

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Abstract

This study examined the effects of personality dispositions and instructions on subjects' sensitivity to changing contingencies on a multiple schedule. Based on a screening test, 24 subjects who scored high on a personality dimension, "Rigidity," and 24 who scored low were selected. All subjects were exposed to a multiple DRL4"/FR18 schedule. One half of the high and low scorers on "Rigidity" received accurate instructions about the schedule, the other half received minimal instructions. After two sessions of reinforcement, the schedule was surreptitiously switched to extinction. The results showed that schedule sensitivity was affected by both the subjects' personality dispositions and the instructions. Subjects who scored high on "Rigidity" showed significantly less sensitivity to the changing contingencies than those who scored low on "Rigidity." In addition, those who had received accurate instructions, when compared to minimal instructions, showed less sensitivity to the change in contingencies, which suggests that instructed performance mimics schedule control but is, in fact, rule-governed. This study provides evidence for the usefulness of assessing "personality dispositions" when studying human behavior in the operant lab. The pre-established behavioral repertoires people bring to the situation deserve to be taken into consideration because they can neither easily be controlled nor eliminated, and they interact significantly with the independent variables manipulated by the experimenter.

Key words: Personality dispositions, rule-governed behavior, instructions, schedule sensitivity, multiple schedules, adult humans.

The term personality, as it is used today, implies that each human being displays a consistent pattern of attitudes and behaviors that makes him or her unique and distinct from other individuals. All people, to a greater or lesser degree, exhibit recognizable distinctive characteristics that serve to identify them. These characteristics, which are relatively constant across time and diverse situations, are usually taken as the manifestation of an individual's underlying personality traits. Traits may be defined as hypothetical entities. They are disposition terms (Brody, 1988) in that they refer to characteristics which are not invariably expressed because their manifestation depends upon certain evoking conditions. To say, for example, that an object is water soluble is not to say that one will find it in a dissolved condition. It only means that under the appropriate circumstances the object will dissolve (Brody, 1988). Similarly, to say of people that they are assertive or shy is not to say that these individuals inevitably will be assertive or shy. It simply means that under certain conditions they will behave assertively or display shyness.

One of the problems of trait theory is that the circumstances leading to the actualization of trait dispositions usually are not clearly specified. Nevertheless, some personality researchers have asserted that traits mani-

fest themselves depending on whether the individual experiences a situation as "strong" or "weak."

From this perspective, personality traits are expected to play a lesser role in psychologically "strong" situations because these situations are fairly structured and provide salient cues to guide behavior. People in church, for example, generally behave very similarly regardless of any personality dispositions they might have. However, in psychologically "weak" situations, which are fairly unstructured or ambiguous and do not provide clear cues, behavior is assumed to be largely determined by personality traits. For example, people at a party often vary considerably in their behavior, with some being outgoing, some shy, others flirtatious, and so on. An observer might well attribute these varying behavior patterns to differences in people's personalities.

From a behavioristic perspective, the traditional notion of personality as an originating agent is not considered useful. Appealing to internal personality processes or structures as the causal determinants of behavior violates behavioristic assumptions of what constitutes a cause. This is not to say that radical behaviorists fail to recognize that some behaviors show temporal and cross-situational consistencies, or that repertoires traditionally labeled as personality traits can be lawfully related to other behaviors. It means, however, that they do not conceptualize such behavior-behavior relations in terms of cause-and-effect relations. Given that the behavioristic position is functional and its goal is the prediction *and* control of behavior, causal factors are ultimately reserved for those variables that are manipulable. This is why behaviorists find "behavioral causes" objectionable, because behavior can never be changed without in some way changing its context.

The fact that radical behaviorists to date have contributed little if anything to the study of personality may, in part, stem from their objection to nonmanipulable causes. But there are without doubt other reasons. For example, behavior analysts traditionally have always been more interested in the discovery of general principles governing behavior than in the study of individual differences. This is not to say that they in principle reject the study of individual differences. In fact, Skinner (1956) has at least implied that individual differences can be the explicit target of investigation, although his own research was exclusively concerned with the search for behavioral principles common to all organisms. Nevertheless, operant researchers, with few exceptions (e.g., Harzem, 1984), have treated individual variability not as a phenomenon to be studied in its own right but more as an undesirable interference to be controlled for or eliminated. Consequently, behavior analysts have made no significant contributions to

an understanding of phenomena that commonly have been ascribed to differences in personality traits.

Another reason for behavior analysts' disinterest in the study of individual differences probably results from the fact that the bulk of operant research has been conducted with nonhuman subjects. Although considerable individual differences exist even among nonhumans, they are minimal compared to the enormous intersubject variability observed with humans. This has become exceedingly clear as behavior analysts recently have begun to focus on the analysis of human behavior in the operant laboratory. Numerous studies on schedule-control, rule-governed behavior, and stimulus equivalence have shown that individual differences are a ubiquitous phenomenon. Different people in the same experimental situation often respond unpredictably to the same tightly controlled contingencies. Their behavior seems markedly insensitive to the contingencies manipulated by the experimenter, and this insensitivity can neither be easily reduced nor eliminated. Observations of behavioral invariance across time and situations have formed the basis for the widespread belief that there must be some internal structure or process that determines behavior. While it is understandable that radical behaviorists reject hypothetical internal causal mechanisms, it is not justifiable if therefore they eschew the analysis of behavioral phenomena underlying the popular notion of personality. If people bring idiosyncratic behavioral repertoires to an experimental situation and if these repertoires cannot be easily controlled or eliminated, it becomes indispensable to study how they interact with the independent variables manipulated by the experimenter.

The study presented below was designed to examine how human performance on an operant schedule changes as a function of pre-existing behavioral repertoires, or traits, and the "strength" or "weakness" of situational cues. Previous research (e.g., Hayes, Brownstein, Hass, & Greenway, 1986) has shown that on complex operant schedules in individuals' sensitivity to changing contingencies is influenced by the types of instructions received. Specifically, accurate instructions (which from the present point of view can be said to provide "strong" discriminative stimuli for performance) immediately establish effective performance. However, accurate instructions often interfere when the contingencies suddenly change as people tend to follow the initial instructions even when they are no longer effective. In other words, instructing people about behavior-consequence relations may make them insensitive to changes in the contingencies, possibly because the instructed behavior is rule-governed and maintained by consequences other than those specified in the instructions (see Zettle & Hayes, 1982, for an explanation of the contingencies su-

rrounding different types of rule-following). In contrast, minimal instructions (which according to the present conceptualization provide only "weak" cues for performance) do not produce such an insensitivity effect. That is, if subjects are exposed to a schedule of reinforcement without being instructed about the schedule parameters, their behavior will gradually come under the control of the programmed consequences and subsequently show a much greater sensitivity to changing contingencies.

One factor manipulated in the study presented below was the type of instructions subjects received before being exposed to a multiple DRL/FR schedule of reinforcement. Specifically, the analysis focused on the effects of accurate versus minimal instructions upon schedule performance when the programmed consequences, without the subjects' knowledge, were discontinued and the schedule was switched from reinforcement to extinction. The effects of a second factor on schedule performance were also examined. Subjects were selected according to the relative presence or absence of a personality disposition, "rigidity" (Rehfish, 1958), to examine its interaction with the schedule. It was assumed that subjects with certain rigid response dispositions would show less sensitivity to changing contingencies than would those with more flexible tendencies. In summary, sensitivity to changing contingencies on a multiple schedule of reinforcement was assumed to be the function of two variables: the type of instructions received and pre-established response repertoires subjects brought to the situation. These assumptions were examined in the study presented below.

METHOD

Subjects

Forty-eight college undergraduates of both sexes from an introductory course in psychology served as subjects for this study. The subjects were selected based on a screening instrument, with twenty-four scoring high and 24 low on "personality rigidity" (Rehfish, 1958). They received experimental credit for their participation.

Design

The design was a 2X2 factorial design with one factor consisting of personality rigidity (high versus low), and the second factor consisting of the

type of instructions subjects received for the experimental task (accurate versus minimal instructions).

Procedure

In a preliminary screening session, the Scale for Personality Rigidity (Reh-fisch, 1958) was applied to approximately 300 undergraduates to identify subjects who either scored high (at or above the 80th percentile of the screening sample) or low (at or below the 20th percentile of the screening sample) on this device. Twenty-four high and 24 low scorers were selected.

During the experimental phase, all subjects were run individually. Subjects were seated in a small room (about 2 m by 3m) that contained a chair, a table, a TV monitor, and a small metal box holding a normally open momentary contact button (Radio Shack 275-518). The monitor and the response button were connected to a microcomputer in an adjoining room. When operating, the monitor projected diagonally, from the upper left to the lower right corner, an array of five squares (about 4 cm by 4 cm each) with a small marker in the form of a plus sign in one of them.

At the beginning of the experiment, four groups were constituted: One half of the subjects who had scored high and one half of those who had scored low on the Rigidity Scale were randomly assigned to the Accurate Instruction condition, the other half were assigned to the Minimal Instruction condition. All four groups were informed that the task consisted of moving a marker through an array of squares appearing on the TV screen by pressing the lever, the marker would reset once the last square was reached, and they would earn one point for each time the marker reset. In addition, groups 1 (high rigidity) and 3 (low rigidity) received accurate instructions:

When the signal light on the TV screen is white, pushes on the lever with several seconds in between them will work best. When the signal light is dark, fast pushes on the lever will work best.

Groups 2 (high rigidity) and 4 (low rigidity) received only minimal instructions:

The marker can be moved by pushing the lever and by observing the signal light on the screen.

Lever presses were reinforced on a multiple DRL4ⁿ/FR18 schedule by movements of the marker and the addition of one point to a counter whenever the marker reset after having reached the fifth box. Points were worth chances at two \$ 15 prizes. The experiment consisted of three 32-minute

sessions, with five-minute breaks between sessions. The schedule components alternated every two minutes between DRL and FR. During the first two sessions, the reinforcement contingency was in effect. At the beginning of the third session, however, the schedule was surreptitiously switched to extinction. During extinction the signal lights continued to alternate every two minutes as before; however, the point delivery was discontinued and the marker no longer moved.

RESULTS

During the second half of Session 2, the behavior of all subjects apparently was under schedule control, as everyone responded appropriately to the multiple DRL/FR schedule and earned points in both components. There were no significant differences among the four groups in performance or in the number of points earned on the schedule. All subjects responded at approximately the same rate in the latter half of Session 2, regardless of their scores on the Rigidity Scale or the instructions they had initially received.

To assess how schedule-sensitive the performance of subjects in the four groups actually was when, unbeknownst to the subjects, the contingencies were suddenly changed from reinforcement to extinction, a behavioral index of "rigidity" was derived. For this purpose, the relative rates of responding during the second half of Sessions 2 and 3 were compared. Relative response rates were expressed in two ratios by dividing the total number of responses to DRL by the number of responses to DRL plus FR for both the latter half of Session 2 (hereafter termed "Ratio Reinforcement") and of Session 3 (hereafter termed "Ratio Extinction"):

$$\frac{\text{\# of responses to DRL}}{\text{\# of responses to DRL + FR}}$$

Then a "Response Perseveration Index" was obtained by dividing the Ratio Reinforcement by the Ratio Extinction to determine how much subjects persisted in the same *pattern* of responding from reinforcement to extinction:

$$\frac{\text{Ratio Reinforcement}}{\text{Ratio Extinction}} = \text{Response Perseveration Index}$$

As during Session 2 the response rate on DRL was much lower than on FR, the Ratio Reinforcement was small for all subjects. If subjects persisted in the same pattern of responding during the extinction phase (i.e.,

if in the absence of further reinforcement they continued to respond slowly when the DRL schedule light was on and fast when the FR light was on), the Ratio Extinction was similar to the Ratio Reinforcement and the Response Perseveration Index approached 1.0. In contrast, if subjects stopped responding differentially to DRL and FR during the extinction phase, the response rates in DRL and FR would gradually become more similar, the Ratio Extinction would approximate 0.5, and the Response Perseveration Index would become progressively smaller than 1.0. In other words, the more the subjects tended to persist in the *same* response pattern from reinforcement to extinction, the more closely the Response Perseveration Index approached 1.0.

TABLE 1

RESPONSE PERSEVERATION INDEX:

| | ACCURATE INSTRUCTIONS (n = 24) | MINIMAL INSTRUCTIONS (n = 24) |
|---------------------------|--------------------------------------|-------------------------------------|
| HIGH RIGIDITY (n = 24) | Group 1: 0.53 | Group 2: 0.28 |
| LOW RIGIDITY (n = 24) | Group 3: 0.32 | Group 4: 0.12 |

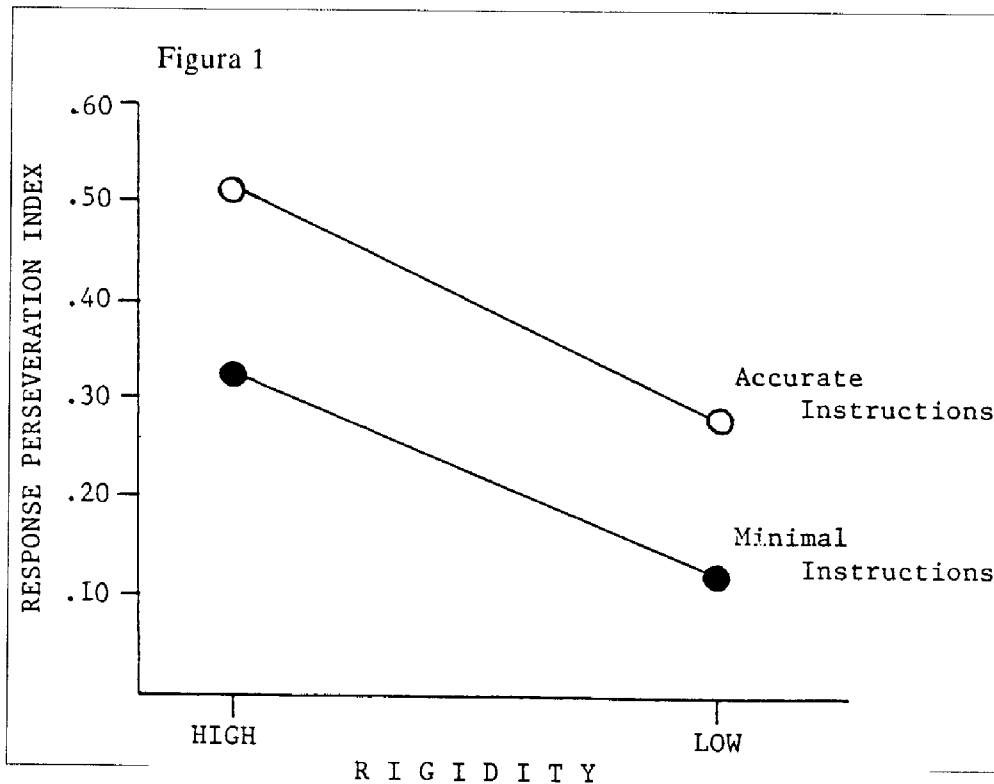
TWO-WAY ANOVA:

| | | | |
|--------------|--------------|----------|----------|
| INSTRUCTIONS | d. f. (1,44) | F = 9.32 | p < 0.01 |
| RIGIDITY | d. f. (1,44) | F = 6.31 | p < 0.04 |

Average Response Perseveration Index:

Average Response Perseveration Index for the four groups of subjects, by types of instructions (accurate vs. minimal) and levels of personality rigidity (high vs. low). A Two-Way ANOVA resulted in two main effects, for instructions and for rigidity. There was no interaction effect.

The average Response Perseveration Index (see Table 1) for group 1 (Accurate Instructions/High Rigidity) was 0.53; that for group 3 (Minimal Instructions/High Rigidity) was 0.32; and that for group 4 (Minimal Instructions/Low Rigidity) was 0.12. An analysis of variance performed on the group data revealed two main effects, for instructions [$F(1,44) 9.32, p.01$] and rigidity [$F(1,44) 6.314, p.04$], meaning that subjects who had received accurate instructions showed a significantly greater tendency to persist in the same response pattern from reinforcement to extinction than those who had received minimal instructions, and similarly, high-scorers on the Rigidity Scale showed a significantly greater response perseveration than low-scorers. There was no interaction effect (see Figure 1).



Response Perseveration during Extinction:

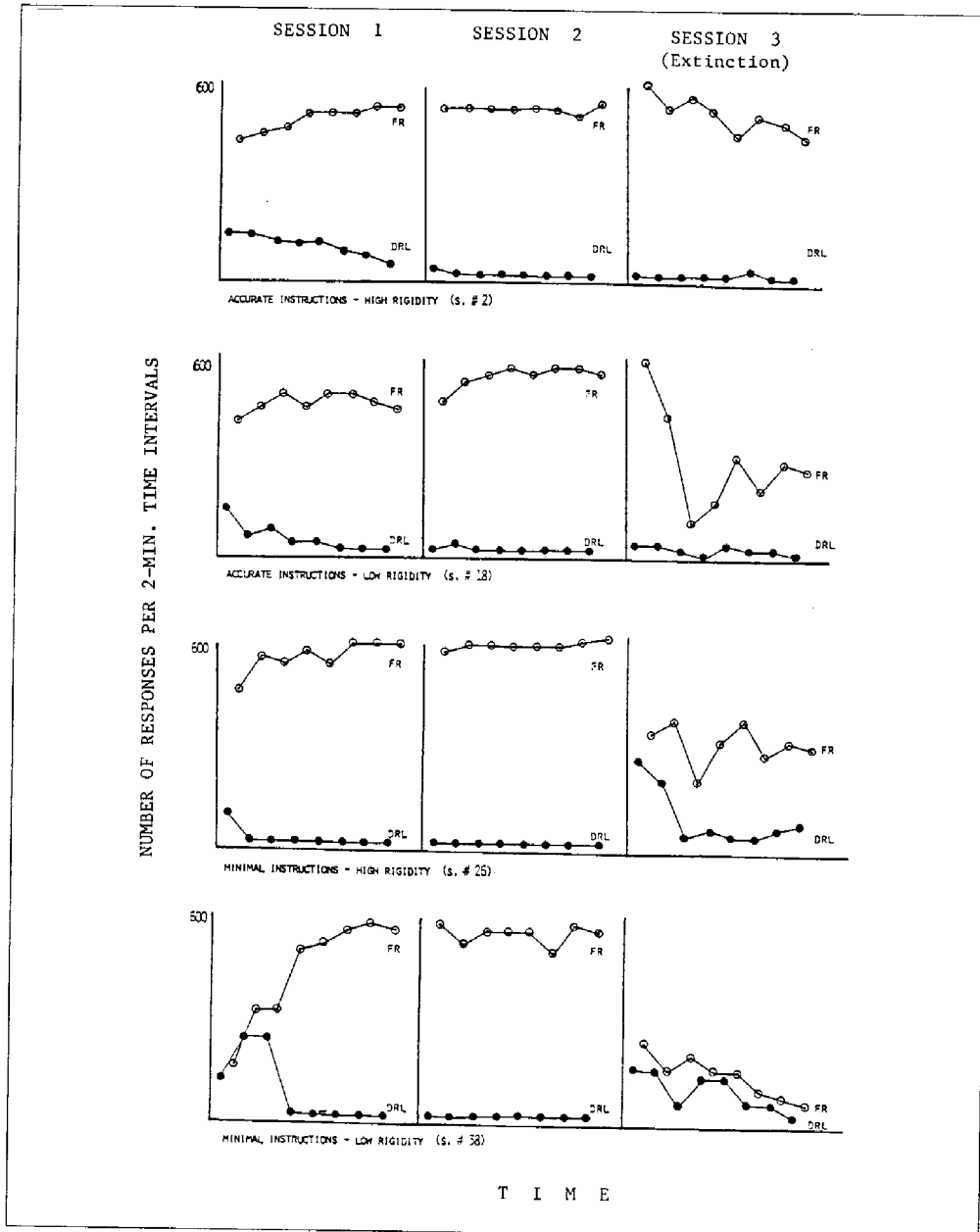
The Response Perseveration Index is a measure of persistence in the same response pattern from reinforcement to extinction, with higher numbers indicating greater perseveration. Subjects receiving accurate instructions and scoring high on rigidity showed the greatest tendency to perseverate. They were followed by subjects receiving minimal instructions but scoring high on rigidity, and subjects receiving accurate instructions but scoring low on rigidity. Finally, the most flexible behavior was shown by subjects receiving minimal instructions and scoring low on rigidity.

In essence then, changes in response pattern from reinforcement to extinction in the present study was a function of both the behavioral dispositions subjects brought to the experiment and the type of instructions they received. To illustrate the effects of these two variables, the data of four representative subjects (one from each of the four groups) are presented in Figure 2.

These data show that the greatest level of perseveration was displayed by subjects who were high on rigidity and who received accurate instructions. The performance of subjects scoring low on rigidity who had received accurate instructions was topographically similar to the performance of subjects high on rigidity who had received minimal instructions. Finally, the most flexible performance was displayed by subjects with low rigidity who had received minimal instructions.

DISCUSSION

The present study replicates findings from previous research (e.g., Hayes et al., 1986), demonstrating that performance controlled by instructions often mimics schedule sensitivity, although the behavior is in fact not or only tenuously controlled by the programmed contingencies. While instructions describing the programmed contingencies can quickly establish behavior that in its topography is in accord with the specified schedule, responding may nevertheless be rule-governed. This becomes evident when the apparently schedule-sensitive behavior does not adjust to changes in the described contingencies. In the present study, the performance of all subjects during the initial two sessions seemed to be controlled by the multiple DRL/FR schedule, regardless of whether accurate or minimal instructions had been given. When the schedule was switched to extinction, however, it became apparent that the behavior of subjects in the Accurate Instruction groups showed much less sensitivity to this change than did that of subjects in the Minimal Instruction groups. This so-called "insensitivity effect" has been explained in various ways. Instructions have been said to generate a relatively narrow range of performance that precludes effective contact with a given schedule (Baron & Galizio, 1983). While this explanation may be correct to some degree, it must also be considered that instructions probably introduce additional contingencies which then compete with or modify the programmed contingencies (Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1986). This suggests that the behavior of subjects who received accurate instructions was only in part controlled by the point-contingency and in part was rule-governed. When the schedule was switched



Individual Response Rates of Representative Subjects from Groups 1-4:

This figure presents the individual data of four subjects during Sessions 1 and 2 (reinforcement) and Session 3 (extinction) on a multiple DRL4"/FR18 schedule. Their performance is representative of other subjects in their respective groups: Subject # 2: Group 1 (accurate instructions and high rigidity); Subject # 18: Group 2 (accurate instructions and low rigidity); Subject # 26: Group 3 (minimal instructions and high rigidity); Subject # 38: Group 4 (minimal instructions and low rigidity).

to extinction, their behavior remained to some degree controlled by the instructions provided at the beginning of the experiment. Consequently their performance showed a smaller range of variability and fewer extinction effects when compared to the behavior of subjects in the Minimal Instruction groups.

The present study also identified a second factor that was associated with the observed insensitivity effect. It was shown that subjects who scored high on the Scale for Personality Rigidity (Rehfishch, 1958), when compared to low scorers, manifested a significantly greater tendency to persist in responding during extinction regardless of the instructions they had received at the beginning of the experiment. This finding underlines the importance of assessing relevant individual differences in human subjects, as the independent variables manipulated by the experimenter do not control responding in a vacuum. Subjects come to an experiment with different behavioral repertoires or dispositions, presumably resulting from pre-experimental variables, and important variables that would contribute to a better understanding of behavior may be missed if one fails to consider these individual differences.

As this time, any explanations as to why individuals scoring high on the Rigidity Scale show a marked insensitivity to changing contingencies is necessarily speculative and requires further analysis. One possibility is that individuals with "rigid" response dispositions are especially good rule followers. It has been pointed out elsewhere (Zettle & Hayes, 1982) that rule-governed behavior involves two distinct sets of contingencies. One set involves the contingencies directly related to the behavior of interest. In the present study, this contingency was the multiple DRL/FR schedule. The second set of contingencies is verbal and to date has only been established in humans because of their ability to mediate consequences for compliance, with a given rule. Given these dual contingencies following instructions usually leads not only to the consequences directly specified in the rule, but also to additional consequences mediated by the rule-giver in the form of praise or punishment for compliance or noncompliance with the instructions. Some people thus follow instructions not because the consequences directly specified are reinforcing, but to avoid possible social sanctions for noncompliance. Although presently we do not know how behavioral repertoires such as rigidity emerge and persist, we can speculate that so-called "rigid" people may have been exposed early in their lives to contingencies where rule-following was strictly enforced. This history might conceivably have increased their disposition to show "pliance" (Zettle & Hayes, 1982, p. 80), i.e., compliance with instructions per se, instead of "tracking" (Zettle & Hayes, 1982, p. 81), i.e., rule-following becau-

se the consequences specified in the contingency function as reinforcers. To illustrate, a parent may say, "It's cold outside, put your coat on." The child may comply not because he wants to stay warm (in fact, he may hate wearing a coat as it gets in the way with playing) but because he wants to stay out of trouble with his mother who would scold him if he did not comply. A history where compliance with parental rules and norms was strictly enforced, often through aversive means, may well establish a generalized tendency to comply with instructions provided by authority figures. Moreover, as many parental rules are prohibitions consisting of "don'ts" rather than "do's" the child may gradually learn to exhibit a more and more restricted range of "safe" (i.e., non-objectionable) behaviors, which seems typical of so-called "rigid" individuals.

Of course, high scorers on the Rigidity Scale in the present experiment showed perseverative response tendencies during extinction not only when they had received accurate instructions, but also when no specific instructions had been provided (i.e., in the Minimal Instruction group). This finding seems most readily interpreted in terms of self-rule following. Adult humans with complex verbal repertoires, when confronted with a problem-solving task, most likely will formulate hypotheses about the task and the contingencies involved. Individuals scoring high on the Rigidity Scale are probably not only good rule followers when the instructions are externally provided, but also when they themselves have formulated the rules. In other words, their tendency to show pliance may have generalized from external to self-generated instructions. Once they have formulated and effective rule, they may be hesitant to abandon it because of a history where the correspondence between saying and doing was strictly enforced.

What are the implications of the findings presented above? First, the present study strongly suggests that behavior analysts may be well advised to consider pre-existing individual differences or personality repertoires when studying human behavior in the operant laboratory. Behavior-analytic research has barely scratched the surface of this issue. Much work remains to be done to gain a better understanding of the ways in which prior exposure to contingencies interacts with the contingencies directly manipulated in an experimental situation.

A second issue that needs to be addressed in future research is whether and under what conditions long-standing, firmly ingrained behavioral repertoires can be changed. The answer to this question has important implications for applied clinical settings. According to some estimates (e.g., Salzman, 1974), the single largest group of patients seen by mental health professionals present what is termed a personality disorder; and yet personality disorders are the least understood and researched of all the psychia-

tric disorders. Behavior analysts could potentially make an important contribution to the advancement of clinical science if they investigated the issues surrounding behavioral organization and stabilization of repertoire. It would be important from both a basic and an applied perspective to understand what types of response clusters tend to covary, how complex response classes are developed and maintained, and how they become relatively insensitive to prevailing contingencies.

While it is understandable that radical behaviorists reject the traditional conception of personality, they would throw the baby out with the bathwater if at the same time they disregarded the empirical phenomena which have given rise to the use of the term. And yet it appears that in the past the empirical data may have gotten lost in conceptual debates about whether "personality" is or is not an explanatory fiction. The dismissal of a concept as mentalistic may not be fruitful if consequently one fails to consider that there are true behavioral phenomena underlying the concept which require an explanation. Conceptual differences should never get in the way of investigating behavior, and a behavioral analysis of individual differences seems long overdue.

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