

THE RELATIONSHIP OF GOAL STRUCTURE TO MOTIVATION UNDER EXTREME CONDITIONS¹

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Many studies have shown that properties of a goal, such as its valence or accessibility, have effects upon motivated behavior, but little attention has been given to the combined properties of a number of goals and their effects upon motivated behavior. We may conceive of the goals of a person as having a structure in much the same way as do motives (4, 5), attitudes (10, 11), and concepts (8). The present paper is concerned with the instrumental relationship between goals. A *given or proximate goal* is termed an *instrumental goal*, if it is regarded by the subject as instrumental to the attainment of some more *remote or ultimate goal*, i.e., if the achievement of the former increases the perceived probability of attaining the latter.

We assume, firstly, that motivation to move toward a goal which is instrumental is higher than motivation toward a goal bearing no instrumental relationship to a more remote goal. This assumption, phrased by some in the language of expectancies, and by others in terms of subjective probabilities, has found support in recent studies (3, 7, 11) and is an important part of a number of conceptions of motivation (1, 2, 6, 9, 10, 12, 13).

But since the present aim is to treat some of the combined properties of more than one goal that influence motivation, more than the dimension of instrumentality is needed. A significant additional factor is the valence of the more remote goal for which a given goal may be instrumental. It is almost axiomatic to coordinate the valence of a goal to the strength of the force on the individual to achieve the goal (8). Thus our second assumption is that an individual's motivation to attain an instrumental goal is associated positively with the valence of the more remote goal or goals.

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Putting the two assumptions together we have said that the valence of a proximate goal derives in part from its instrumentality in attaining more remote goals, and in part from the valence of these more remote goals. These combined properties of a proximate goal—its instrumentality in itself, and the valence of the more remote goal, or goals, for which the proximate goal is instrumental—define the *instrumental value* of the proximate goal.

The general hypothesis of this study is that the higher the instrumental value of a given proximate goal, the more positive will be its valence, and hence the stronger the motivation to attain it.

This study examines this relationship under the extreme conditions of a simulated survival situation. Because the situation was conducive to stress, the relationship between the instrumental value of a goal, and tension and morale was also investigated.

METHOD

Subjects. The subjects were 459 Air Force trainees who were taking two weeks of training in the skills of survival, evasion, and escape. They ranked from Airman 3rd Class to Lt. Colonel, with 78 per cent commissioned officers. Over half were 27 years old or less and 60 per cent had been in the Air Force five years or less.

The survival trek and evasion exercise. During winter-time, following three days of orientation in "static camp," the trainees were taken in small groups, generally composed of strangers, into rugged mountainous country where they spent seven days. The men began the trek, hiking with their groups to a designated pick-up point, a distance of 35-40 miles. Most of the time they moved over and around mountains in snow averaging four feet in depth. They wore snowshoes and carried packs weighing fifty pounds. The limited food supply was augmented by what could be found or captured on the land; water was particularly scarce. Shelter was provided by paratepees carried in their packs. A compass was used to cross territory that lacked established trails. Groups often got lost temporarily because of circuitous routes made necessary by the mountainous country and by movements to evade "enemy" forces.

Although most of the participants began and ended the trek with attitudes favorable toward it as a useful experience, they also indicated that it was not an easy chore. Many of the men gave up because of exhaustion or discouragement, and some reacted with strong emotion to the stress they were asked to endure.

After the men were transported from the pick-up point back to the base, an 18-hour exercise followed. During this exercise they had to move through villages and across highways, dealing with problems that survivors would meet in thickly populated areas. Although the territory of both the survival trek and the shorter exercise was occupied by the "enemy," capture was much more common during the latter. A captured man was taken to a "prisoner-of-war compound."

Procedure and measures. The subjects' proximate goal was to acquire knowledge and skills relevant to survival in unfamiliar territory.

1. The measure of *instrumental value* of this goal was based upon responses to a questionnaire given to the trainees one day before they embarked on the survival exercise. Each trainee rated on a seven-point Likert-type scale the "attractiveness" of the following ultimate goals: a career in the Air Force, increased confidence in ability to survive, desire to survive in any future survival experience, and desire to advance in the Air Force—these ratings representing the valences of the ultimate goals. The perceived instrumentality of the proximate goal was

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measured by having each trainee rate, at a later point in the questionnaire, the "relevance" of the proximate goal for attaining the ultimate goals. The "attractiveness" score for each ultimate goal (valence score) was multiplied by the "relevance" score for the proximate goal (instrumentality score), and the sum of these products was taken as the score for "the instrumental value of the proximate goal" to the trainee. The scores so obtained ranged from 16 to 196, with a mean of 108.06 and a SD of 30.82.

The 224 trainees scoring 110 and above were considered the "highs," the 235 scoring below 110, the "lows." *All the data obtained are analyzed by comparing the "highs" with the "lows."*

2. During the survival trek, the trainees completed each day a brief *field questionnaire*, administered by the field instructor. The items concerned *motivation* to continue, as well as experienced *tension*, disturbance, and difficulty, and were rated on a seven-point Likert-type scale.

3. The field instructors ranked each man in their crews on the basis of his performance that day, in: ability to control emotions, effort and persistence displayed, morale, and adaptability to changing conditions. Reliability in the use of the observation schedule was determined during practice sessions before the trek began, when the field instructors ranked on the four characteristics three hypothetical trainees going on a trek. Percentages of agreement between the *instructor's rankings* and *a priori* rankings by the investigators were all in the 70's. Suggestive data on the reliability of the schedule in the field were obtained in the ten crews accompanied both by an instructor and an assistant. Their rankings were correlated and median *rhos* for the four characteristics computed. After eliminating all median *rhos* in the nineties as being possibly spuriously high due to copying the remaining median *rhos* were found to range from .40 to .62, with over half of all *rhos* for the four characteristics being significantly different from zero ($p = .05$ or less) in the positive direction.

4. After the 18-hour final exercise, the trainees completed a *post-trek questionnaire*, again reacting to their experiences by means of seven-point Likert scales. The items concerned perceived stressfulness of the trek and of the evasion exercise. All trainees captured during the trek and the 18-hour exercise were identified.

RESULTS

Motivation. The results in Table I indicate that the "highs" on instrumental value of the goal scored higher than the "lows" on the following subjective indices of motivation: attractiveness of the trek,

TABLE I. MEAN SCORES ON INDICES OF MOTIVATION, BY INSTRUMENTAL VALUE OF GOAL

Indices of Motivation	Instrumental Value of Goal		df	t	p
	High	Low			
Attraction of trek (pre-trek)	5.51	4.66	452	4.97	<.005
Anticipated effort to evade capture (four-day average)	6.04	5.44	458	5.31	<.005
Anticipated feelings of failure if captured (four-day average)	3.87	3.53	458	1.48	<.01
Degree of remorse about having been captured (trainees captured on 18-hour exercise)	4.50	3.88	92	3.10	<.01
Desire to go faster on trek (four-day average)	3.44	3.33	457	1.55	<.30

before the trek began; anticipated effort to evade capture while on the trek; anticipated feelings of failure in the event of capture; degree of remorse about having been captured, for trainees captured on the 18-hour exercise; and desire to go faster while on the trek, but not to a statistically significant degree. Motivation to attain a proximate goal is, then, positively related to its instrumental value.

Performance. An important indicator of vigorous performance was evasion of being captured, for the objective of the exercise was to progress to the end-point. Capture therefore is an objective indication of a trainee's lack of effort, as well as his lack of skill in avoiding apprehension. Of the 105 trainees who were captured, 62 per cent were lows, and 38 per cent were highs ($X^2 = 5.22, p = .03$).

Taking the field instructors' rankings of the trainees' performance, as shown in Table 2, it can be seen that highs were ranked high more often than lows on: effort displayed each day, and adaptability to changing conditions. "Effort displayed" is the more direct indicator of vigor of performance, because "adaptability" was defined to include

TABLE 2. FIELD INSTRUCTORS' RANKINGS OF THE MEN (FOUR-DAY AVERAGE), BY INSTRUMENTAL VALUE OF GOAL

Characteristics for Instructors Rankings	Instrumental Value of Goal				χ^2	<i>p</i>
	High		Low			
	N	%	N	%		
Effort displayed—performance						
high	64	35	43	21	10.02	.01
medium	77	42	96	47		
low	42	23	65	32		
Adaptability to changing conditions— performance						
high	63*	35	49	24	8.55	.02
medium	79	43	86	42		
low	40	22	69	34		
Ability to control emotion—tension						
high	60	33	49	24	3.70	.20
medium	71	39	91	45		
low	52	28	64	31		
Morale						
high	70	38	50	24	8.75	.02
medium	68	37	88	43		
low	45	25	66	33		
Total N**	183		204			

*One subject's rankings were not available here.

**These totals are lower than the original 224 highs and 235 lows, because some instructors failed to complete the rankings, or, in a few cases, the ranking data were lost or never provided at all.

the trainee's willingness to change if others regarded it to be necessary and his ability to develop new plans when such were required. Vigor of performance is thus positively associated with instrumental value of the goal.

Tension. Table 2 also shows that the instructors ranked highs more often than lows as high in ability to control their emotions, although this relationship fails to reach statistical significance.

The trainees' tension responses are primarily presented in Table 3. They show that the highs, compared to the lows, found the trek less difficult and less disturbing while on the trek, and after the evasion exercise, found both it and the trek less stressful. Amount of tension and discomfort experienced by the trainees in their goalward movement is negatively related to the instrumental value of the goal.

TABLE 3. MEAN SCORES ON INDICES OF TENSION, AND ONE INDICATOR OF MORALE, BY INSTRUMENTAL VALUE OF GOAL.

Indices of Tension and Morale	Instrumental Value of Goal		df	t	p
	High	Low			
Perceived difficulty on trek (four-day average)—tension	2.96	3.31	457	2.27	<.05
Disturbance experienced on trek (four-day average)—tension	1.51	1.86	457	3.50	<.01
Perceived stressfulness of trek (post-trek questionnaire)— tension	2.71	3.08	452	2.80	<.01
Perceived stressfulness of evasion exercise (post-trek questionnaire)—tension	2.72	3.12	452	2.80	<.01
Perceived value of trek as a learning experience (post- trek questionnaire)—morale	4.84	4.35	450	3.01	<.01

Morale. The results similarly indicate a positive relationship between instrumental value and morale. The trainees ranked highest in morale by the instructors were more often high on instrumental value than low (Table 2). In the post-trek questionnaire the highs rated the value of the trek as a learning experience higher than did the lows (Table 3).

DISCUSSION

The findings indicate that there is a positive relationship between the instrumental value of a goal and motivation to attain it, thus supporting the contention that a goal derives its valence in part from its

instrumental value. The extent to which a goal in fact acquires its attracting or repelling properties from its instrumental value rather than from reward intrinsic to the goal region itself indicates the amount of the goal's valence that is extrinsic to it. To distinguish it from intrinsic valence, this type of valence might be identified as the *instrumental valence*. From the viewpoint of the present approach, the instrumental valence of a proximate goal is largely a function of the structure of the individual's goals as a whole, particularly the dependence of ultimate goals upon the attainment of the proximate goal. A fruitful line for subsequent research would be to explore other structural dimensions as possible sources of the instrumental valence of a proximate goal, such as how central the proximate goal is to the other goals to which it is linked, and the complexity of the total goal structure.

The degree of attractiveness of the trek and evasion exercise appeared to derive largely from their instrumental value rather than from experiences on them that may have been intrinsically gratifying. The tasks were difficult and demanded considerable effort and perseverance in performance. These factors no doubt contributed to the rather close relationship of the pencil-and-paper measures of instrumental value and the measures of performance—a relationship to behavior not often found to follow from many measures that are cognitive and attitudinal. Still, the study was non-experimental. A more rigorous test of the main hypothesis would require, in addition to some of the forementioned aspects of the field situation, the experimental manipulation of a goal's instrumental value through creating a proximate goal having no intrinsic value which is highly instrumental to attaining more ultimate goals of known value; motivation to attain this proximate goal could then be compared with motivation to attain a like proximate goal bearing a very low instrumental relationship to ultimate goals. Variation of the value of ultimate goals, holding constant (above some low point) the instrumentality of the proximate goals for attaining them, would also be required.

SUMMARY

This study examined the problem of the motivational qualities of a given goal which bears the instrumental relationship to an individual's more ultimate goals. It was proposed that such a goal derives at least part of its valence, or attractiveness, (1) from its value for mediating the attainment of the individual's other, more ultimate goals,

its instrumentality, and (2) from the valence of these other goals. These combined properties were defined as the *instrumental value* of the goal. The hypothesis was that the valence of a given goal varies positively with its instrumental value. Several predictions from this hypothesis were tested in a field situation in which military personnel were being trained in skills of survival, evasion, and escape.

The results were: 1. The instrumental value of acquiring skills and knowledge relevant to survival in unfamiliar territory, measured prior to the survival experience, was positively associated with indices of subjective motivation of the men and with behavioral measures of the vigor of performance of the men while on the survival trek. 2. Men attributing high instrumental value to the goal experienced less tension and had higher morale in goalward movement than men attributing low instrumental value to the goal.

It was suggested that the valence of a goal which derives from its instrumental value be identified as *instrumental valence*, to distinguish it from the intrinsic attraction and potential for immediate gratification.

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