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INFORMATION PROCESSING, SITUATION SPECIFICITY, AND THE GENERALITY OF RISK-TAKING BEHAVIOR

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Abstract

An effort was made to construct two structurally similar risk-taking tasks in order to evaluate inter-task consistency of individual differences. Only the mode of response differed between tasks. In one task, subjects chose their preferred bet within each of a number of pairs of bets. In the other, they set selling prices for these same bets. A measure of the subject's preference for "long shot" gambles was obtained from each response. Reliable individual differences were found for each measure. However, the inter-measure correlation was relatively low considering the high degree of similarity between tasks. It is argued that the two response modes triggered different methods of processing information about probabilities and payoffs in a way that perturbed individual differences and reduced inter-task consistency. Information-processing considerations may be one important component of the situation specificity prevalent in risk-taking behavior. These results imply that high correlations are unlikely between risk-taking measures in structurally different settings or between risk-taking and other behaviors.

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Kogan and Wallach (1967, p. 208) posed a question fundamental to our understanding of risk-taking behavior: "How important are individual consistencies relative to situational constraints when it comes to predicting someone's inclination for risk or conservatism?"

Slovic (1962) found little correlation among several different kinds of risk-taking measures administered to the same subjects. This result implied that most of the variation among individuals was situationally determined, and it cast doubt upon the existence of a general trait of risk-taking propensity. Since then, this failure to find trans-situational generality for individual differences in risk taking has been replicated in studies by Brichaček (1968), Flanders (1970), Goodman (1970), Greene (1963, 1964), Higbee (1970), Johnson (1963), Weinstein (1969), and Weinstein and Martin (1969).

Some investigators, such as Cohen and Christianson (1970), have reacted to this negative experimental evidence with disbelief, arguing that it flies in the face of personal experience that attests to the coherence of individual behavior. Others have criticized these studies in more specific ways in an attempt to explain why they failed to find the expected levels of generality. One criticism is that they have failed to include a proper sampling of risk-taking behaviors. However, the studies cited above have

employed a remarkably thorough assortment of risk-taking tasks in problem-solving, athletic, social, vocational, and pure gambling situations. Only those tasks highly similar in structure and involving the same sorts of payoffs (e.g., all financial, all social, etc.) have shown any generality (e.g., Slakter, 1970) and, as similarity decreases, these inter-task correlations rapidly decrease (Kogan & Wallach, 1964; Weinstein, 1969).

Researchers such as Flanders (1970), Kogan and Wallach (1964), and Slovic (1964) have hypothesized that more generality would exist among tasks which provided real, rather than hypothetical, payoffs. And Higbee (1970) has proposed just the opposite -- that imagined or fantasized risk taking may be more general than actual behavior. To date, neither of these hypotheses has received empirical support.

Slovic (1964) hypothesized that the subjective aspects of risk taking might explain the lack of generality among observed behaviors for tasks in which subjective probabilities and subjective values (utilities) vary widely between individuals. That is, persons may act consistently with regard to their subjective perceptions of the risks involved, even though their overt behavior appears to be variable. If this hypothesis is valid, researchers would have to scale subjective probabilities and utilities in order to allow the orderliness of risk-taking behavior maximum opportunity to emerge. Pitz and Reinhold (1968) and Weinstein (1969) did just this, but neither study found much trans-situational generality even among subjective risk-taking levels.

While there are only a few exceptions to this negative trend, they are worth noting. Maehr and Videbeck (1968) obtained a biserial correlation

of .62 between subjects' bet preferences and their scores on a risk-taking questionnaire. Kogan and Wallach (1964) found little generality across a wide variety of risk-taking measures for their sample as a whole. However, they found that certain subgroups of individuals, specifically those high on defensiveness and anxiety, reacted to diverse tasks in terms of their risk-taking implications and thus showed a substantial degree of trans-situational generality. In addition, women showed more consistency then men. In essence, anxiety, defensiveness, and sex acted as moderators of the consistency of inter-individual differences in risk taking. Similarly, Weinstein and Lewinsohn (1968) found little relationship between two measures of pre-decisional information seeking across their entire sample, but they did find consistency within subgroups of "repressors" and "sensitizers." The strategy of searching for moderator effects thus holds some promise. However, since correlations are obtained within each of several subgroups, the likelihood of capitalizing upon chance increases. Replication is advisable, and, thus far, there have been few attempts to replicate these results.

In summary, the majority of evidence argues against the existence of risk-taking propensity as a generalized characteristic of individuals. Situational determinants seem much more important than organismic characteristics. Yet, we have little knowledge about the nature of these situational effects beyond the simple realization that, as inter-situation similarity decreases, generality likewise decreases. The purpose of the present study is to demonstrate how a rather subtle situational characteristic of risk-taking tasks can alter a person's information-processing strategies in a way that attenuates individual consistencies in behavior.

The rationale behind the present experiment stems from the results of previous studies by Slovic and Lichtenstein (1968) and Lichtenstein and Slovic (in press) showing the influence of information-processing considerations upon risk taking. Slovic and Lichtenstein found that changes in response mode had a strong influence upon the manner in which an individual weights probabilities and payoffs when evaluating a gamble. They found that choices and ratings were determined primarily by the gamble's probabilities. However, when subjects were asked to evaluate a bet in terms of the maximum amount they would pay to play it (or the minimum for which they would sell a ticket to play it), their responses were most influenced by the amounts to be won and lost. Specifically, when subjects found a bet attractive, their buying and selling prices correlated predominantly with the amount to win; and when they disliked a bet, the amount to lose was the primary determiner of their responses. It was argued that these differences between ratings and choices on the one hand and price responses on the other demonstrated the influence of information-processing considerations upon the method by which a gamble is judged. When setting a price, subjects were evaluating the gamble in monetary units and this requirement apparently led them to attend more to payoffs than they did when making choices and ratings.

This result suggested that it might be possible to construct a pair of gambles such that an individual would choose one of them but set a higher selling price for the other. For example, consider the pair consisting of Bet P (.90 to win $4 and .10 to lose $2) and Bet $ (.30 to win $16 and .70 to lose $2). Although both bets have equal expected values, Bet P has a

much higher probability of winning while Bet $ offers a much larger winning payoff. If choices tend to be determined by probabilities, while selling prices are most influenced by the amount to win, one would expect that subjects might choose Bet P over Bet $ but set a higher price on Bet $. This hypothesis was tested by Lichtenstein and Slovic, using many pairs of P bets and $ bets, and it was strongly confirmed.

Evidence from these experiments indicates that an individual who is deciding on a selling price for a bet he sees as favorable starts with the amount to win and adjusts it downward to take the other attributes of the bet into account. The amount to win translates directly into a price. However, the probabilities of winning and losing are more difficult to translate into monetary units. In trying to adjust his price to take this other information into account, the individual is not very precise. Some persons simply subtract a constant (or a variable amount that is uncorrelated with the probability and amount to lose) from the amount to win. Others multiply the amount to win by the probability of winning, entirely disregarding the amount to lose. The P bets offered high probabilities of winning so their modest winning payoffs needed to be adjusted downward only slightly to take the other factors into account when setting a selling price. In contrast, the $ bets offered only a modest chance to win. Therefore, subjects should have made a sizable downward adjustment of the large amount to win when setting prices for these bets. They generally failed to do so and thus ended up stating much higher prices for $ bets than for P bets of comparable expected value. This, in turn, led their selling prices to differ from their choices. In choice, each attribute of

the bet can be directly compared with the same attribute of the other bet. There is no natural starting point and one may use any of a number of strategies to determine his choice. Quite often, the bet with the higher probability of winning is selected over the bet with the higher winning payoff.

In the present study, the Lichtenstein and Slovic experiment was replicated with an emphasis upon examining the consistency of individual differences in risk preference across choice and selling-price response modes. Each subject was asked to choose among a number of pairs of P bets and $ bets. He also set selling prices for each of these bets. Subjects were then scored on an index of preference for $ bets (long shots) over the P bets (sure things). Each subject had two scores, one based upon his choices, the other upon his selling prices. These scores were correlated across subjects to determine the generality of this particular risk-taking characteristic.

Since each subject evaluated the same bets in two different ways, differential subjective probabilities and utilities could not bias the results. The choice and selling-price responses should have been determined only by the underlying subjective attractiveness of the gambles. Structural and motivational similarity between the tasks was very great. Therefore, this study can be viewed as an attempt to produce a high degree of trans-situational generality. However, we know that the difference between the two response modes has a profound effect on the strategies by which subjects process information. To the extent that all subjects are not equally influenced by these processing effects, these effects may interfere with any consistent individual differences in risk-taking dispositions. The magnitude

of the obtained correlation between the two response conditions should indicate the extent to which this particular situational factor can perturb a stable individual-difference characteristic.

METHOD

The subjects were 92 college students, 44 men and 48 women. Each subject chose among 38 pairs of P bets and $ bets, and also gave his minimum selling price for each of the 76 gambles employed in the 38 pairs. One-half of the subjects gave selling prices after making their choices (order A), while the other half gave selling prices prior to making choices (order B). Prior to each task, subjects made 10 choices or gave 10 selling prices among practice bets. Results from the practice bets were excluded from analysis.

Considerable attention was given to maximizing motivation and minimizing indifference or carelessness. The subjects were run in small groups and were given lengthy and careful instructions. A number of the bets were actually played at the end of the session and subjects were paid their winnings.

Stimuli. The bets within each of the 38 pairs were equated in expected value. Each P bet had a winning probability from 24/36 to 33/36; the probability of winning for the $ bet ranged from 3/36 to 15/36. The probabilities were expressed in 36ths because a roulette wheel was used to play the bets. The $ bet always had a larger amount to win than the P bet. The win typically exceeded the loss in a given bet.

The bets were chosen in an attempt to represent a variety of P bets and $ bets. Payoffs were expressed in points; the winning amount ranged from 10 points to 1000 points; the losing amount from 10 points to 370 points. The

expected values ranged from +10 points to +300 points. Table 1 presents the first 6 pairs in the choice condition to illustrate their characteristics.

Insert Table 1 about here

Instructions. For the choice task, each subject was simply asked to choose, from each pair, the bet that he preferred to play. After each choice, subjects indicated how strongly they preferred their chosen bet by marking one of four lines on their answer sheet; the first line was labeled "slight" preference and the fourth was labeled "very strong" preference. The instructions suggested that the two intermediate lines might be labeled "moderate" and "strong."

The instructions for the selling-price response were more involved. The subject was told to imagine that he owned a ticket to play the bet and was asked to name a minimum selling price such that he would be indifferent to playing the bet or receiving the selling price. All the persuasions discussed by Becker, De Groot, and Marschak (1964) were used to convince the subject that it was in his best interest to state, as his selling price, exactly what that bet was worth to him -- no more and no less. Specifically, the subject was told that the experimenter would choose a counteroffer, against which to compare the subject's price, by spinning the roulette wheel and entering the number so obtained in a conversion table specially designed for each bet. The conversion table was a list of the 36 roulette numbers with a counteroffer associated with each number. If the counter-

offer was equal to, or greater than, the subject's stated bid, the experimenter would buy the bet from the subject, paying him the amount of the counter offer. If the counter offer was smaller than the subject's price, no sale would be made and the subject would play the bet. The counter offer tables were constructed on the basis of previous bids for similar bets, with a range chosen to include most of the anticipated bids. The values of the counter offers can influence the expected value of the game as a whole, but they do not affect the optimal response strategy, a fact which was pointed out to the subjects.

Further discussion of the technique emphasized two points: (a) The strategy that the subject should follow in order to maximize his gain from the game was always to name as his price exactly what he thought the bet was worth to him. (b) A good test of whether the subject's price was right for him was to ask himself whether he would rather play the bet or get that price by selling it. The price was right when the subject was indifferent between these two events.

The procedures described above were designed to make it unwise for the subject to state a selling price that was higher or lower than the bet's subjective worth. This fact was explained to him as follows:

"For example, if you think a bet is worth 100 points, then you shouldn't care whether you play the bet or get 100 points for sure. Suppose you asked 100 points for this bet, your best estimate of its true worth to you. Now, if the experimenter's offer is 100 points or more, he will pay you his offer. If less, you must keep the bet and play it. By naming a selling price of exactly 100 points you will thus either play the bet (worth 100 points) or

be paid 100 points or more. But suppose you were greedy and bid a selling price of 120 points. Now if the experimenter's offer is 120 points or more, you will be paid his offer -- but that would be the same as if you had only bid 100 points. Also, if his offer is 100 points or less you will still keep and play the bet. That is the same as before, too. But if the offer is between 100 and 119 points, you will have to keep your bet (worth only 100 points), whereas you could have been paid off at the offered price had you bid the true 100-point value of the bet.

"Naming a price lower than your best estimate of the true value of the bet will also work against you. Here's how: Suppose you only asked 80 points for this bet. Now if the experimenter offers 100 points or above you will get his offered price -- just as if you had bid 100 points, so that's the same. Similarly, if he offers less than 80 points you keep the bet; that's the same, too. But if he offers between 80 and 99 points, then you must sell your 100-point bet for his offer, and thus get less for it than you think it's worth. Therefore, your best strategy, and the one we want you to use, is to name a selling price exactly equal to your best estimate of what each bet is worth for you. Remember, as before, some of these bets will really be offered and then either sold or played. Your earnings will depend on the outcome, so name your selling price wisely!"

Playing the bets was deferred until the subject had made all his choices and set all of his selling prices. Points earned were converted to money such that the minimum win for the two-hour experiment was 80¢ (even for subjects who had a net loss of points), while the maximum win was $8.00. The concept of converting points to money, and the minimum and maximum win, were explained

to subjects at the beginning of the experiment. However, the actual conversion curve was not revealed until the experiment was over.

RESULTS

Two indices of preference for the $ bet over the P bet were computed for each subject. The first index was the mean strength of preference rating, across the 38 pairs of bets. Preferences for the $ bet were coded as positive numbers ranging from 1 to 4 and preferences for the P bet were coded as negative numbers. Therefore, a person with consistently strong preferences for the P bet would have a high negative score on this index. The second index was the mean selling price for the 38 $ bets minus the mean selling price for the 38 P bets.

To assess the reliability of each of these measures of preference, the same two indices were computed separately for the bets in the 19 odd-numbered pairs and the 19 even-numbered pairs. The choice index based on odd-numbered pairs was then correlated, across subjects, with the choice index based on even-numbered pairs. Similarly, the preference index derived from selling prices for bets in odd-numbered pairs was correlated with the comparable index based on prices for bets in even-numbered pairs. These split-half reliabilities were then adjusted via the Spearman-Brown formula to estimate the reliability of the full-length measures.

Insert Table 2 about here

The results of these analyses are shown in Table 2. They indicate that both risk-taking indices were highly reliable. It is also evident that

some moderate degree of generality was present although the magnitudes of the inter-task correlations were considerably less than the reliabilities of the individual measures would permit.

Female subjects did not show greater inter-task generality than males, contrary to the findings of Wallach and Kogan (1964). Why generality should be relatively low among females in the Order A condition is not clear, and the result may be simply a chance fluctuation.

The difference between the high within-task reliabilities and the moderate cross-task correlations can be viewed as evidence for the perturbation of individual consistencies by the information-processing factors described earlier. The scatterplot displayed in Figure 1 shows this in more detail. First, it is apparent that response mode exerted a global influence upon preference for the $ bet in a direction consistent with previous research; about 70% of the scores on the choice index were negative, indicating a general preference for the P bet, yet $ bets were given higher mean selling prices by about 80% of the subjects. As expected, there were many subjects whose choices indicated a preference for P bets but whose selling prices were greater for $ bets. Also as expected, there were few of the reverse inconsistencies, where a subject chose $ bets yet stated higher selling prices for P bets. What the scatter plot shows, moreover, and what is most important here, is that, for any given level of preference based on the choice index, there was considerable variation in the level of the selling price index. Some subjects gave selling prices consistent with their choice preferences; others did not. The end result was a marked reduction in inter-task consistency.

Insert Figure 1 about here

DISCUSSION

In this experiment, an effort was made to create two structurally parallel measures of risk-taking propensity, in order to produce a high degree of inter-task consistency. The choice and selling-price indices both assessed preference for "long shot" gambles over gambles with a very high probability of success. The same gambles were used in both conditions, insuring that subjective probabilities and utilities would be equivalent across the two tasks. The subjects were carefully instructed and motivated, and reliable individual differences were found in each task. The correlations between the two risk-taking indices were high enough to provide definite evidence for inter-task generality. However, in light of the efforts that were made in order to increase generality, the modest size of these correlations must be viewed more as support for the importance of situational factors than support for the notion of risk-taking propensity as a stable trait. The fact that a simple change in response mode can create so much inconsistency among individuals' relative standings in the group implies that high correlations between risk-taking measures in structurally different settings or between risk-taking and other behaviors are unlikely to be found.

The situational specificity within the domain of risk taking, and the disruptive influence of response mode shown in the present study, parallel

the findings from other behavioral realms (for example, see Acker & McReynolds, 1967; and Sermat, 1970). An extensive review of research on the stability of individual traits is provided by Mischel (1968), who surveyed the literature dealing with cognitive, attitudinal, and personality characteristics. The latter included attitudes towards authority and peers, moral behavior, despondency, agression, tolerance for ambiguity, and rigidity. Mischel summarized his findings as follows:

"First, behavior depends on stimulus situations and is specific to the situation: Response patterns even in highly similar situations often fail to be strongly related. Individuals show far less cross-situational consistency in their behavior than has been assumed by trait-state theories. The more dissimilar the evoking situations, the less likely they are to lead to . . . consistent responses from the same individual. Even seemingly trivial situational differences may reduce correlations to zero. Response consistency tends to be greatest within the same response mode. . . . Intraindividual consistency is reduced drastically when dissimilar response modes are employed [Mischel, 1968, p. 177]."

Mischel and others have argued that a viable approach to personality must bridge the gap between the principles of experimental psychology and the problems that confront the personality psychologist. The present study can be viewed as a step in this direction: for [illegible]

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FOOTNOTES

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Table 1

A Subset of the Bet Pairs Used in the Experiment

Pair	P Bet	$ Bet
1	30/36 WIN 250 3/36 LOSE 230	9/36 WIN 980 27/36 LOSE 100
2	33/36 WIN 210 3/36 LOSE 30	9/36 WIN 1000 27/36 LOSE 80
3	33/36 WIN 40 3/36 LOSE 80	9/36 WIN 240 27/36 LOSE 40
4	27/36 WIN 30 9/36 LOSE 10	3/36 WIN 900 33/36 LOSE 60
5	27/36 WIN 200 9/36 LOSE 370	3/36 WIN 800 33/36 LOSE 10
6	27/36 WIN 60 9/36 LOSE 20	15/36 WIN 460 21/36 LOSE 260

Table 2

Reliabilities and Inter-Task Correlations

Order	Sex	N	Choice Reliability	Selling Price Reliability	Inter-Task Correlation
A	M	22	.91	.97	.64
A	F	24	.86	.99	.30
B	M	22	.89	.97	.55
B	F	24	.92	.96	.55
A	M&F	46	.90	.98	.40
B	M&F	46	.90	.96	.55
A&B	M	44	.90	.97	.55
A&B	F	48	.89	.98	.40
A&B	M&F	92	.90	.97	.46

Note--Order A was choice first and selling prices second. Order B was the opposite.

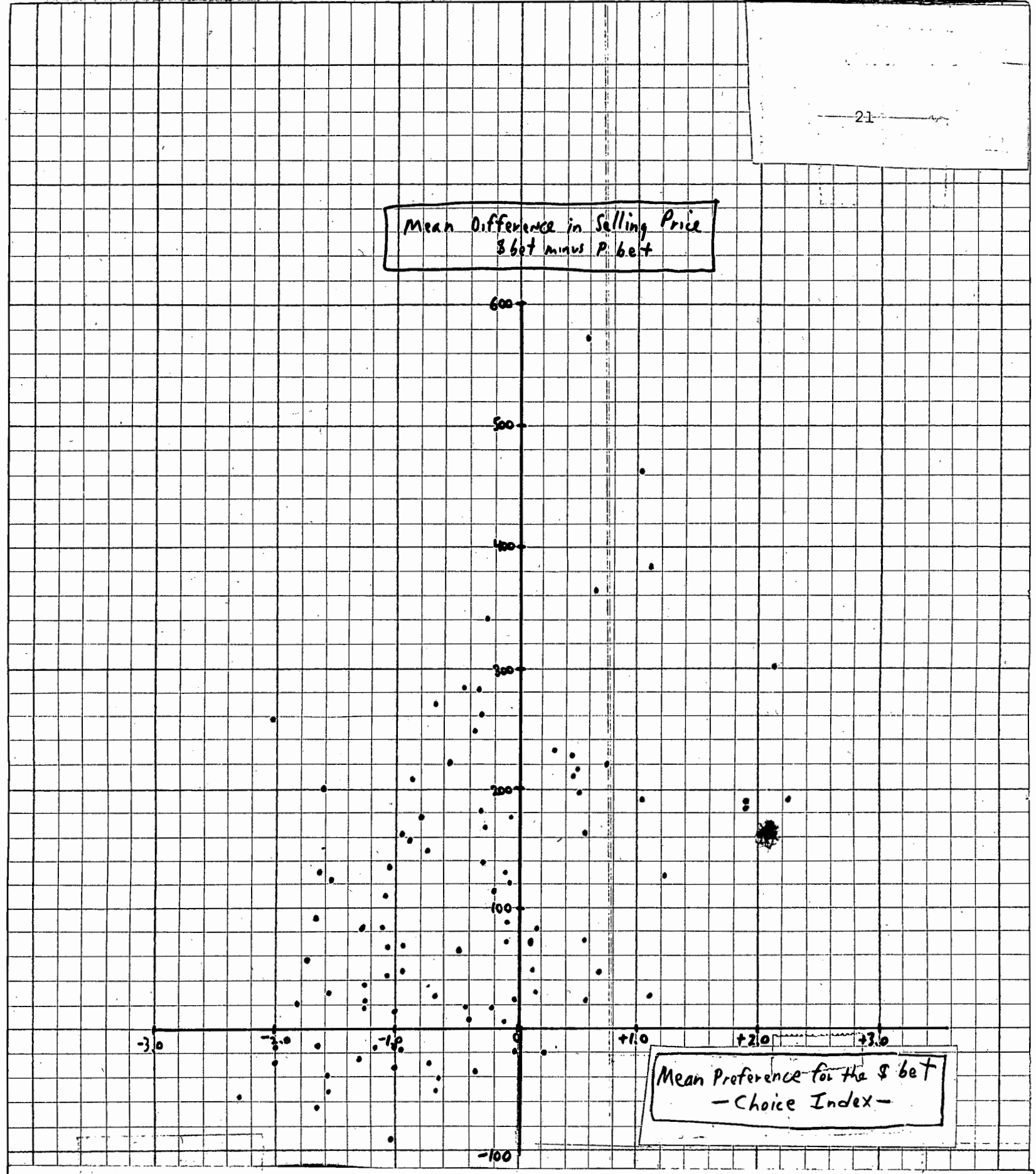

Figure 1. Relationship between choice and selling-price indices across the total sample of subjects (r = .46).

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