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Investment Orientations Among Small-Scale  
Fishermen in the Gulf of Nicoya, Costa Rica

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INTRODUCTION Development programs which include technological change often depend, in part, on the entrepreneurial orientations of individuals in the affected sector. In developing countries this is especially true with respect to small-scale fishermen, many of whom are already entrepreneurs as a result of the nature of their occupation and productive equipment involved (cf. Pollnac, Gersuny, and Poggie 1975; Pollnac and Poggie N.D.; Poggie 1977; Aronoff 1967). Although the cost of small-scale fishing equipment is not negligible, it is still within the means of a hard working fisherman who wisely invests his earnings. Nevertheless, rampant inflation in many parts of the world coupled with the perceived need for more sophisticated productive equipment has led to increased costs for the independent small-scale fisherman; thus, making it more difficult to initiate and sustain development in a sector of the economy which is becoming increasingly important in regions suffering from protein shortages. Even in situations where initial development of the small-scale fishery is produced by injection of funds from outside sources, there is still a need to sustain development through investment of reasonable amounts of profit to provide for equipment maintenance and replacement. The marine environment is especially hard on equipment

(cf. Pollnac 1976), and if such provisions are not made, the initial investment may be lost due to destruction or breakdown of productive equipment. Given these conditions, it is therefore essential that we understand factors associated with investment orientations among small-scale fishermen in areas where development programs are anticipated.

Investment orientations cannot be considered without taking into account theories concerning gratification behavior. Some individuals, under certain conditions, defer gratification, that is they postpone immediate desires to obtain more substantial rewards in the future. Others immediately gratify their desires. Investment in productive equipment can be considered deferred gratification behavior; therefore, investment orientations are related to the larger body of theory dealing with gratification orientations.

A great deal of research has related gratification orientations to a host of sociocultural variables. Variability in gratification orientations has been related to modernization and acculturation. Some researchers report a positive relationship (e.g. Doob 1960; Graves 1967; Rogers 1969; Inkles 1969), others find no relationship (Sexton and Woods 1977), while one study reports a nonlinear relationship with a tendency for deferred gratification behavior to increase, level off, then decrease slightly as the degree of modernization increases (Pollnac and Robbins 1972).

Studies relating age to deferred gratification have reported negative (Mischel and Metzner 1962; Lessing 1968; Pollnac and Robbins 1972; Levy 1976), positive (Pollnac and Poggie N.D.), inconsistent, and no relationship (Doob, 1971; Robbins and Thompson 1974; Pollnac, Gersuny, and Poggie 1975). Socioeconomic status has been reported as having both a negative (Thompson 1975; Levy 1976) and a positive relationship (Graves 1967; Wober and Musoke-Mutanda 1971) with deferred gratification. Findings have also been inconsistent with regard to urbanization. Gold (1967) reports a positive relationship between degree of urbanization and deferred gratification, while several other studies report a negative relationship (Robbins and Thompson 1974; Thompson 1975). Economic predictability and security (Rodgers 1967; Meade 1971; Robbins and Thompson 1974; Thompson 1975; Margolis 1977; Sexton and Woods 1977; Pollnac and Poggie N.D.), community level of economic development and industrialization (Turner 1971; Rosen 1971), education (Doot 1960; Armer and Youtz 1971), periodicity of income (Pollnac, Gersuny and Poggie 1975), efficacy and optimism (Pollnac, Gersuny and Poggie 1975; Thompson 1975; Pollnac and Poggie N.D.) are all reported as having positive relationships with deferred gratification. Finally, several researchers report a negative relationship between deferred gratification and reward salience (Mischel, Ebbesen, and Zeiss 1972; Robbins and Thompson 1974; Thompson 1975).

The large number and complexity of the variables related to gratification orientations may be responsible for some of the inconsistent findings cited above. Situational differences in the directions of relationships between independent variables account for some of the inconsistencies (Pollnac and Poggie N.D.). Thompson's (1975) research also supports the proposition that situational constraints must be carefully controlled. It is therefore important to control for situational factors, as well as the variables cited above, in studies concerning variance in investment orientations. The purpose of this paper is to examine investment orientations and their sociocultural correlates among small-scale fishermen in the Gulf of Nicoya, Costa Rica.

#### METHODS

SAMPLE Data for this report are based on interviews with 125 small-scale fishermen from the Gulf of Nicoya, Costa Rica. A sample of 75 was drawn from Barrio el Carmen, Puntarenas. Puntarenas, the major Pacific port of Costa Rica, is located on a thin finger of land jutting westward into the Gulf of Nicoya approximately 110 kilometers west of San Jose. Barrio el Carmen is at the extreme western end of Puntarenas and is inhabited primarily by small-scale fishermen. A sample of 50 small-scale fishermen were interviewed at Costa de Pajaros, a concentration of fishermen in a rural

region approximately 21 air-kilometers from Puntarenas on the coast of the Gulf of Misoya. In both areas most small-scale fishermen fish from motorized wooden plank or dugout vessels from 15 to 30 feet in length using handlines and/or nets. Some still use sail or oars. Surplus production (i.e. that not used for subsistence) is sold to middlemen who distribute it to other middlemen or retailers.

Several important situational factors distinguish the rural and urban areas. Individuals in the rural area are much less tied into the cash economy than those in the urban area. In the rural area many small-scale fishermen have subsistence plots and domestic animals (usually pigs and chickens). Additionally, food can be bought or bartered from family, friends, or local farmers at much lower prices than in the city. In the urban area fishermen are locked into the cash economy. There is much less space for subsistence plots and domestic animals; thus, almost all non-fish food is purchased from local shop keepers. Finally, electricity is available in Puntarenas but not at Costa de Pajaros. Consequently, numerous shops in Puntarenas are stocked with luxury goods such as stereos, televisions, blenders and refrigerators which depend upon electricity; thus, increasing the salience of expensive, non-productive goods among the urban fishermen.

TESTS Investment Orientations were determined with the use of several questions: (1) if you were to receive 1500

Colones (approximately 8.5 Colones equals one U.S. Dollar) as a gift or inheritance, what would you do with it? (2) if you were to receive \$500 Colones as a gift or inheritance what would you do with it? (3) under what conditions would you invest in more fishing equipment? (4) what would you invest in? Responses to all questions were content analysed. Responses to the first two questions were further classified and coded as deferred if the response reflected an investment for future gain (e.g. purchase fishing equipment, put in bank, buy a business, etc.) or immediate if lacking an investment factor (e.g. buy things for the house, clothing, etc.). The immediate category was assigned a value of zero, and the deferred a value of one. Values assigned to each of the two questions were summed for each fisherman resulting in a scale having a range of from zero to two. This scale is referred to as the EGOCOMP Scale.

Turning to the independent variables, self-evaluation of socioeconomic position, perceived socioeconomic progress, optimism and efficacy were determined with the use of the ladder of life test (Cantril 1963). The ladder of life test consisted of showing the respondent a ladder diagram with ten rungs. He was told that the top rung represented the best possible life and the bottom, the worst. He was then requested to tell us where he felt he stood on the ladder at the present time ( $T_0$ ), five years in the past ( $T_{-5}$ ), and

five years in the future ( $T_{+5}$ ).

Another potential indicator of occupational optimism used in this study was the response to a question concerning whether or not an individual would like it if his son became a fisherman. It is assumed that individuals who are pessimistic about the future of fishing would prefer their sons to enter other occupations.

Material culture was measured with the use of a check list containing seven material items: (1) indoor plumbing; (2) indoor toilet; (3) electricity; (4) radio; (5) television; (6) refrigerator; (7) sewing machine. Each item was assigned a score of one if present and zero if absent. The scores for all eight items were summed forming a scale of material items. Item total correlations were calculated and all were high (ranging from 0.48 to 0.82) except for radio ownership. Radio ownership was eliminated from the scale, and item-total correlations were re-calculated. All item-totals were high (ranging from 0.46 to 0.87;  $p < 0.01$ ). The resultant scale, composed of six items, is referred to as the Material Cultural Scale.

Another aspect of material culture measured was fishing technology. Fishing technologies were ranked from one to seven in terms of relative complexity, with the higher numbers referring to the least complex equipment. The rankings were as follows: 1-long line and net; 2-net and hand line; 3-net; 4-long line and hand line; 5-long line; 6-hand line; 7-hand(shellfish collecting).

Exposure to mass media was measured by asking fishermen how many days per week they listen to the radio, read newspapers, watch television, read magazines, and go to the cinema. Frequencies for the five mass media were summed forming a scale with a potential range of from 0 to 35. Item total correlations were calculated and were found to range from 0.41 to 0.60, all significant at better than the 0.01 level. This scale is referred to as the mass media exposure scale.

Income was measured by responses to questions concerning total annual income in the past year, income in the past month, and income in maximum and minimum months. Periodicity of income was calculated by dividing the difference between the maximum and minimum months by the maximum, resulting in a figure that varies between zero (no periodicity) and one (indicating maximum periodicity).

Age, father's occupation, and years of formal education were determined from answers to direct questions. Finally, ownership of means of production was considered as a potential indicator of economic security. This variable was measured by determining if the individual fisherman owned the boat from which he fished.

ANALYSIS Investment Orientation Turning first to the dependent variables, we will examine the range of responses

to the four investment orientation questions. Categorized responses to the question concerning conditions which would lead to investment in additional equipment can be found in Table 1.

Table 1. Percent Distribution of Preconditions for Investment in Additional Fishing Equipment.

<u>CONDITION</u>	<u>PERCENT</u>
More fish	68
More financing	21
Nothing	5
Better prices	3
Pay off present debts	1
Need for spare equipment	1
Loss of present equipment	1

N = 80

As can be seen in Table 1, the majority of fishermen said that they would invest in additional equipment if more fish were available for capture. Only 32 percent provide other conditions; the most frequent of which was more financing. In general, the small-scale fishermen feel that there has been a drop in the number of fish available for capture over the years. In response to a question concerning perceived changes in production, 73 percent responded that less fish were being caught at the present time. 21 percent said that the same amount were available, and 6 percent said more. 59 percent of the fishermen attributed lowered production to the existence of more fishermen, boats, and nets. 10 percent, however, suggested that

less fish are available because shrimp boats have been killing the small fish and their food. Overall, it appears that small-scale fishermen feel that there are fewer fish available and that they would invest in more equipment if they were sure they could catch more fish.

The types of equipment that fishermen said they would invest in can be found in Table 2.

Table 2. Percent Distribution of Equipment Types Mentioned as Possible Investments

<u>EQUIPMENT TYPE</u>	<u>PERCENT</u>
Net ( <u>trasmallo</u> )	46
<u>Launcha</u> (vessel)	29
Line	15
Nothing	5
Motor	3
Boat (small boat)	1
Whatever I loose	1

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N = 90

Most fishermen said that they would invest in more nets. Two of those who would invest in nets noted that they would buy nets with a smaller mesh than the ones they presently use. The next most frequent response category concerned purchase of a launcha. A launcha is a dugout or plank vessel from 18 to 36 feet in length with a small cabin and an inboard diesel engine. 15 percent of the fishermen said they

would invest in more line for long line fishing. Other response categories are of relatively low frequency.

Turning next to the question concerning what individual fishermen would do with a windfall of 1500 or 8500 colones, we find that 66 percent would invest the larger amount into some type of fishing equipment while 48 percent would do the same with the smaller amount. Types of equipment, as specified in responses can be found in Table 3.

Table 3. Percent Distribution of Consumption Aspiration Responses.

<u>RESPONSE</u>	<u>8500 Colones</u> <u>PERCENT</u>	<u>1500 Colones</u> <u>PERCENT</u>
Fishing Equipment (general)	44	39
<u>Launcha</u>	9	0
Equipment for vessel	6	2
<u>Both</u>	3	4
Motor	3	1
Down payment on equipment	0	2
Agricultural equipment and seed	1	0
Study	0	1
Buy fish to sell	0	2
Buy animal to fatten	0	2
Put in bank	4	3
Save (bank not mentioned)	3	6
Non-investment responses (e.g., clothes, household items, etc.)	26	38

N = 125

Only a small percentage of the fishermen indicated that they would invest in ventures other than fishing. What is interesting is the fact that, with respect to the 8500 colone question, only about one-fourth of the fishermen

made responses lacking an investment factor. A larger percentage made non-deferred responses to the 1500 colone question, noting that it was an amount unworthy of investment. These findings are in keeping with Poilnac and Poggie (1975; N.D.) and Poggie (1977) who suggest that a deferred orientation is an adaptive characteristic among small-scale fishermen.

Description of Sample Characteristics on Independent Variables The distribution of the independent variables within the total sample and the rural and urban subsamples can be found in Table 4.

The F-Ratios in Table 4 refer to differences between the rural and urban samples. As can be seen in Table 4, differences between the two subsamples are quite extensive. The urban sample is older than the rural, uses more complex fishing gear, is composed of fewer boat owners, and is less likely to look favorably upon one's son becoming a fisherman. With regard to self-evaluation of socioeconomic position, the urban fishermen are higher both five years in the past and the future. Overall, however, the urban fishermen feel that they are worse off today than five years in the past, thus contrasting with the rural who report that they are in a more favorable position. As would be expected, urban fishermen are more exposed to the mass media and score higher on the material culture scale. This is a direct result of the ready availability of electricity, city water, and mass media in the urban setting. Urban fishermen's

Table 4. Distributions of Independent Variables.

<u>VARIABLE</u>	<u>TOTAL</u> <u>SAMPLE</u>	<u>URBAN</u> <u>SAMPLE</u>	<u>RURAL</u> <u>SAMPLE</u>	<u>F-RATIO</u>	<u>d.f.</u>	<u>p</u>
Age . . . . .	30.7	32.7	27.6	5.15	1 123	<.05
Education . . . . .	3.6	3.9	3.2	1.97	1 123	>.05
Years Fishing Experience . . . . .	12.3	12.6	11.8	0.23	1 123	>.05
Own Boat (%) . . . . .	.38	.31	.50	4.85	1 123	<.05
Fishing gear(scale). . . . .	3.7	3.3	4.3	14.61	1 123	<.001
Ladder To . . . . .	4.4	4.5	4.1	0.77	1 123	>.05
Ladder T-5. . . . .	4.4	5.1	3.2	16.31	1 123	<.001
Ladder T+5. . . . .	7.2	7.8	6.4	5.13	1 83*	<.05
Ladder To - T-5 . . . . .	0.0	-0.6	0.9	6.81	1 123	<.05
Ladder T+5 - To . . . . .	2.6	2.9	2.3	1.15	1 83*	>.05
Like Son to Become Fisherman. . . . .	.46	.33	.64	12.31	1 123	<.001
Watch TV (days/week). . . . .	2.7	2.8	2.7	0.06	1 123	>.05
Listen to Radio (days/week). . . . .	5.2	4.7	6.1	7.52	1 123	<.01
Read Newspaper (days/week). . . . .	1.8	2.8	0.3	26.71	1 123	<.001
Read Magazine (days/week). . . . .	0.9	1.2	0.5	3.50	1 123	>.05
Go to Cinema (days/week). . . . .	.1.2	1.9	0.1	22.96	1 123	<.001
Mass Media Exposure Scale. . . . .	.11.9	13.4	9.7	7.63	1 123	<.01
Running Water (%). . . . .	.52	.33	.06	159.86	1 123	<.001
Electricity(%) . . . . .	.49	.81	.02	187.79	1 123	<.001
Radio(%) . . . . .	.82	.79	.86	1.07	1 123	>.05
TV(%) . . . . .	.34	.56	.02	56.43	1 123	<.001
Refrigerator(%) . . . . .	.13	.21	.00	13.34	1 123	<.001
Sewing Machine (%) . . . . .	.30	.33	.24	1.25	1 123	>.05
Toilet Indoors (%) . . . . .	.35	.57	.02	50.46	1 123	<.001
Material Culture Scale . . . . .	2.2	3.3	0.4	125.68	1 123	<.001
Income (maximum month) Colones 1988	2414	1416		9.53	1 115*	<.01
Income (minimum month) Colones 463	623	248		19.60	1 115*	<.001
Income (past year) Colones . . . . .	11,153	13,711	6838	5.18	1 41*	<.05
Income (past month) Colones. . . . .	670	324	432	7.73	1 100*	<.01
Farmer Father (%). . . . .	.25	.23	.28	0.45	1 123	>.05
Fisherman Father (%) . . . . .	.53	.43	.60	8.10	1 123	<.01
Income Periodicity. . . . .	.74	.71	.78	4.72	1 115*	<.05

\* d.f. varies due to missing data on income and ladder questions.

incomes are also significantly higher than the rural. Income periodicity, however, is greater in the rural area. Finally, a larger percentage of rural fishermen have fathers who are also fishermen.

Interrelationships between Independent and Dependent Variables Turning first to gratification orientations, the correlations between most of the independent variables and the EGOCOMP Scale can be found in Table 5.

Table 5. Correlations between EGOCOMP Scale and Independent Variables for Total Sample and Subsamples.

<u>VARIABLE</u>	<u>TOTAL SAMPLE</u>	<u>RURAL SAMPLE</u>	<u>URBAN SAMPLE</u>
Age	-.09	-.09	-.06
Education	-.01	-.01	.01
Years Fishing Experience	.09	.00	.14
Own Boat	.03	.00	.01
Fishing Gear Complexity	.18*	-.12	.30*
Ladder To	-.16	-.22	-.11
Ladder T-5	-.03	-.07	.05
Ladder T+5 (response)	.16	.23	.10
To - T-5	-.10	-.13	-.13
Like Son to Become Fisherman	.15	.06	.17
Mass Media Exposure Scale	-.08	-.02	-.06
Material Culture Scale	-.19*	-.17	-.18
Maximum Month Income	-.16	.06	-.22
Minimum Month Income	-.22*	.01	-.26*
Father Farmer	-.14	-.21	-.11
Father Fisherman	.17	.20	.13
Income Periodicity	<u>.13</u>	<u>-.07</u>	<u>.23</u>
	N		
	117	50	67

\*p < .05

Ladder T+5 (response) in Table 5 refers to whether or not the respondent refused to guess where he would be on the ladder of life test five years in the future. This variable was created because a significant proportion of the sample refused to hazard a guess concerning the future. It is suggested that refusal to respond to the future component of the ladder test indicates a feeling of lack of control over the future (a non-efficacious feeling). This variable was therefore dichotomized with individuals who give a response receiving a value of one, and those who refuse to respond a value of zero.

Overall, the results are relatively weak. As can be seen in Table 5, only fishing gear complexity and minimum month income are significantly related to the EGOCOMP Scale in both the total sample and the urban subsample. The material culture scale is significantly related to the EGOCOMP Scale only for the total sample.

The results are especially surprising with regard to income periodicity. We have earlier argued and presented strong findings indicating that income periodicity is positively related to a deferred orientation (Pollnac, Gersuny, and Poggie 1975; Pollnac and Poggie N.D.). On retrospect however it seems possible that there might be a non-linear relationship between periodicity and the EGOCOMP Scale. Periodicity, up to a certain level, may stimulate a deferred orientation as has been argued in previous papers (Pollnac, Gersuny, and Poggie 1975; Pollnac and Poggie N.D.). Nevertheless,

it could be argued that a very high level of periodicity may result in a situation of insecurity and instability which could have just the opposite effect. Examination of a scattergram of the two variables suggested that this is, in fact, the case. Second order polynomial regressions were calculated between the dependent variable and periodicity for the total sample and each subsample. This analysis indicated that the relationships are not statistically significant for either the total sample or the rural sample ( $R=0.20$  and  $R=0.07$  respectively;  $p > .05$ ). The results are, however, statistically significant for the urban subsample ( $R=0.33$ ;  $p < .05$ ).

Finally, despite extensive differences between the two subsamples with respect to variables found to be related to economic gratification orientations in other studies, we find that the rural and urban subsamples are not significantly different with respect to mean EGOCOMP Scale scores (1.44 versus 1.29 respectively;  $F\text{-Ratio}= 1.136$ ,  $d.f. = 1, 123$ ,  $p > .05$ ).

As a means of determining combined effects of independent variables on economic gratification orientations, a stepwise multiple regression procedure was used to further analyze the data. In this procedure all independent variables are intercorrelated with the dependent variable, and the independent variable which explains the most variance is entered into the equation first. The next variable entered is

the one which explains the most variance with the first controlled. This procedure is continued until all variables are entered or a previously set criterion is reached. In the analysis presented here, entry into the regression equation was restricted to variables which add at least two percent to the total amount of variance explained. The rural subsample was not independently analysed since it manifests no significant relationships between the independent and dependent variables. The results of this analysis with respect to the total sample can be found in Table 6.

Table 6. Stepwise Multiple Regression between EGOCOMP Scale and Independent Variables for Total Sample.

<u>VARIABLE ENTERED AND CONTROLLED</u>	<u>PARTIAL TO ENTER</u>	<u>MULTIPLE REGRESSION WITH EGOCOMP SCALE</u>
Minimum Monthly Income	-.22	.22*
Father Farmer	-.16	.27*
Material Culture Scale	-.15	.30*

N=117      \*p <.05

Table 6 indicates that three independent variables -- minimum monthly income, father farmer, and material culture -- explain nine percent of the variance in the dependent variable. This multiple correlation is statistically significant at each step, but the total amount of variance explained by these three variables is disappointingly small.

Turning next to the urban subsample, the second order polynomial regression between periodicity and the EGOCOMP

Scale was forced into the equation first. His procedure was justified by the fact that the curvilinear correlation between periodicity and the dependent variable was higher than that between the EGOCOMP Scale and all other independent variables. The stepwise procedure was initiated following the entry of periodicity. The results of this analysis can be found in Table 7.

Table 7. Stepwise Multiple Regression between Independent Variables and the EGOCOMP Scale for the Urban Subsample.

<u>VARIABLE ENTERED AND CONTROLLED</u>	<u>PARTIAL TO ENTER</u>	<u>MULTIPLE REGRESSION WITH EGOCOMP SCALE</u>
Periodicity (2nd Order Polynomial)	.33	.237
Fishing Gear Complexity	.25	.41*
Like Son to be Fisherman	.21	.45**
Father Farmer	-.20	.46**
Material Culture Scale	-.19	.51**

N=67

p < .05

\*\*p < .01

With regard to the Urban Subsample, the first five independent variables entered explain a total of 26 percent of the variance in the dependent variable. This modest, but respectable, amount is statistically significant at the .01 level.

Turning to the question concerning small-scale fishermen's preconditions for further investment in fishing equipment, high frequency categorized responses were cross tabulated with age and education dichotomized at their

sample means (30.6 and 3.6 years respectively), years fishing experience dichotomized at ten and ten or more years, area of residence and net fishing (in any combination with or without line fishing) versus long or hand line fishing only. The results of this analysis can be found in Table 8.

Table 8. Correlations ( $\Phi_1$ ) between Preconditions for Investment in Additional Fishing Equipment and Selected Independent Variables

<u>INDEPENDENT VARIABLES</u>	<u>PRECONDITION</u>	
	<u>MORE FISH</u>	<u>MORE FINANCING</u>
Age	-.16	.25*
Education	.27**	-.23*
Fishing Experience	-.16	.07
Area of Residence	.12	.10
Use of Net	.05	.01

N=80      \*p <.05      \*\*p <.02

As can be seen in Table 8, only age and education are significantly related to the dependent variables. First, we find that older fishermen are more likely than younger fishermen to suggest that more financing is an important precondition for investment in additional equipment. (32 versus 12 percent respectively;  $X^2=5.143$ ,  $p <.05$ ). Next, we see that fishermen with more than the sample mean years of education are more likely to use "more fish" (78 versus 53 percent;  $X^2 = 5.713$ ,  $p <.02$ ) and less likely to use "more financing" (13 versus 32 percent;  $X^2=4.355$ ,  $p <.05$ ) as preconditions for investment in additional equipment.

Equipment types mentioned as possible investments were cross tabulated with the same independent variables, and the results of this analysis can be found in Table 9.

Table 9. Correlations ( $\Phi$ ) between Equipment Types Mentioned as Possible Investments and Selected Independent Variables

<u>INDEPENDENT VARIABLES</u>	<u>NET</u>	<u>EQUIPMENT TYPE</u>	
		<u>LAUNCHA</u>	<u>LONG LINE</u>
Age	-.11	.13	.03
Education	.09	-.07	-.06
Fishing Experience	-.10	.00	-.12
Area of Residence	.25 <sup>†</sup>	.02	.11
Use of Net	.44 <sup>***</sup>	-.24 <sup>*</sup>	-.28 <sup>**</sup>
N=30	<sup>†</sup> p < .05	<sup>**</sup> p < .02	<sup>***</sup> p < .001

Table 9 indicates that only area of residence and use of net are related to possible investments in fishing equipment. First, 56 percent of the urban fishermen, in contrast to only 30 percent of the rural said that they would invest in a fishing net ( $\chi^2=5.098$ ,  $p < .05$ ). Finally, net fishermen are more likely to make further investments in nets (65 versus 21 percent;  $\chi^2=15.663$ ,  $p < .001$ ) and less likely than non-net fishermen to make further investment in a launcha (20 versus 41 percent respectively;  $\chi^2=4.457$ ,  $p < .05$ ) or long lines (7 versus 26 percent respectively;  $\chi^2=6.102$ ,  $p < .02$ ). Figure 1 graphically displays the investment orientations of the different types of fishermen.

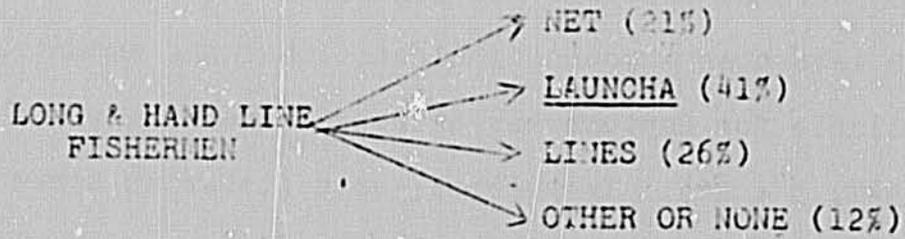
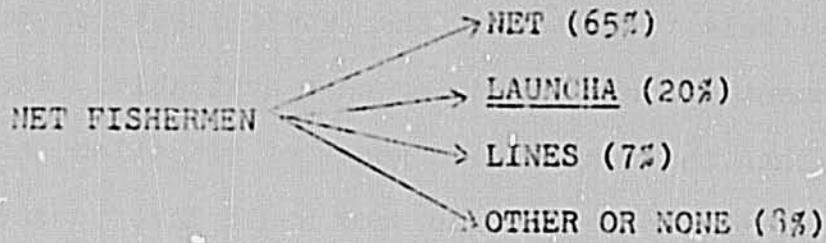


Figure 1. Investment Orientations of Long and Hand Line and Net Fishermen.

DISCUSSION AND CONCLUSION Turning first to preconditions for further investment in capital equipment, we have seen that older fishermen and those with less education are those most likely to note that they would invest in more fishing equipment if more financing were available. Fishermen with more than the sample mean years of education, however, are more likely to argue that they would like to see an increase in fish available for capture before they make further investments in equipment. This finding makes sense in light of the fact that 83 percent of the fishermen with four or more years of education in contrast to only 59% of those with less than 4 years, indicated that the amount of fish available for capture has decreased over the years ( $\chi^2 = 5.547, p < .02$ ). In general, most fishermen agree that average catches are decreasing, but the more educated are less likely to view increased financing of equipment as a solution to the problem.

With regard to fishing equipment as possible investments, it can be seen that, in general, fishermen have a tendency to reinvest in the same general type of equipment that they are already using. The positive relationship between urban residence and orientation toward investment in nets can be explained by the fact that there is a greater percentage of net fishermen in the urban area, and net fishermen tend to say that they would invest in more nets.

Turning to the correlates of gratification orientations, we found strong rural/urban differences. As a matter of fact, the significant zero order correlations for the total sample probably result from the significant correlations between the dependent and independent variables within the urban sample. We will therefore focus our discussion on the urban sample.

The analysis indicates that there is a tendency for deferred economic gratification orientations to increase, level off, then decrease as the degree of income periodicity increases in the urban subsample. It is interesting to note that although the rural subgroup manifests a higher degree of income periodicity than the urban subsample there is no significant difference in economic gratification orientations between the two areas. This suggests that situational factors might be affecting the relationships between the two variables.

As periodicity of income increases, skillful management becomes essential for survival. A future orientation must be maintained to preserve and allocate income to support one's self and family during periods of little or no production (cf. Pollnac, Gersuny, and Poggie 1975; Pollnac and Poggie N.D.). It was suggested above, however, that after periodicity of income increases to a certain point, economic insecurity may result. Several investigators have related economic predictability and security to gratification orientations

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(cf. Rodgers 1967, Meade 1971; Robbins and Thompson 1974; Thompson 1975; Polinao and Poggie N.D.; Margolis 1977). At this higher level of income periodicity, with its concomitant economic insecurity, the individual is living from day-to-day, probably in debt to friends, family, shopkeepers, and middlemen. If he does not spend what he receives, it may soon be claimed by his creditors. Several situational factors may account for the differential existence of these phenomena in the rural and urban subsamples.

It was noted above that individuals in the rural area are much less tied into the cash economy than those in the urban area. In the rural area many small-scale fishermen have subsistence plots and domestic animals (usually pigs and chickens) to help them through less productive periods. Additionally, food can be bought or bartered from family, friends, or local farmers at much lower prices than in the city. Thus a high level of fishing income periodicity probably does not generate insecurity in the rural area since other resources are available. Further, subsistence plots and domestic animals probably assist in leveling out overall periodicity.

In the urban area fishermen are locked into the cash economy. There is much less space for subsistence plots and domestic animals; thus, almost all non-fish food is purchased from local shop keepers. Electricity and luxury goods such as televisions and refrigerators are readily available

Televisions are extremely expensive in Costa Rica, yet over 50 percent of the urban fishermen report that they own one (only one fisherman in the rural sample owned one along with a generator which was necessary for its operation). The urban small-scale fishermen obtain these luxury goods on credit, thus locking themselves into monthly payments for both utilities and the items themselves. Thus, for the urban fisherman, increases in periodicity demand a deferred orientation in order to pay bills and purchase food. When periodicity of income goes beyond a certain point, however, the urban fisherman, in contrast to the rural, goes further into debt and has little opportunity to invest in the future. His funds become committed to past purchases and present existence.

This same type of explanation holds for the significant negative zero-order correlation between minimum monthly income and gratification orientations in the urban area. This correlation indicates that the lower the minimum monthly income, the more deferred the individual fisherman. Once again, this is adaptive in the urban context where fishermen are locked into the cash economy. The smaller the minimum monthly income, the more one needs a deferred orientation to put aside money earned in more productive months for support in lean months. In the rural area, as described above, lesser involvement with the cash economy and alternative food sources reduces the effects of small minimum monthly fishing incomes.

The strong positive relationship between the fishing gear complexity scale and the EGOCOMP Scale indicates that as gear complexity increases, the deferred orientation decreases. Since most responses coded as deferred are fishing equipment, it appears that those who already use complex equipment are less likely to say that they would use a sudden windfall of money for more equipment. Apparently the need for additional gear is not very salient among fishermen who are adequately equipped. The alternative explanation that those with more complex equipment have lower periodicity and higher minimum monthly incomes thus reducing the need to defer was rejected because correlations between these income variables and gear complexity were  $-.12$  and  $-.22$  respectively within the urban sample ( $N=67$ ,  $p > .05$ ).

Once again we find important situational constraints affecting the relationships between economic gratification orientations and other variables. In this case, economic gratification orientations are related to income periodicity and minimum monthly income only in the urban area where small-scale fishermen are committed to the cash economy and often in debt due to the credit structure. Further, income periodicity and minimum monthly income are related to economic gratification orientations only where the effects of these variables are not leveled out by less obvious incomes such as produce from subsistence plots and small

domestic animals. The importance of this variable in contexts of planned change suggests that the situational determinants of economic gratification orientations are of utmost significance, and development schemes should be involved with creating environments favorable to deferred orientations if they are to succeed.

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