

# Deciding Whether to Complete or Terminate an Unfinished Project: A Strong Test of the Project Completion Hypothesis

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**The primary purpose of this research was to subject Conlon and Garland's (1993; Garland & Conlon, 1998) project completion hypothesis to a stronger test than it has faced in the past. We conducted an experiment in which we manipulated the degree of completion, sunk-cost amount, and anticipated sales price for a hypothetical real estate development project. The sales price information allowed participants to calculate the economic value of the project. Participants were also held "accountable" in the sense that they had to explain the reasoning behind their decisions to the experimenter. Together, the sales price information and accountability stipulation created an inducement to engage in an economically rational decision process. In spite of this inducement, participants were unduly affected by the project's closeness to completion. In fact, when the project was close to being finished, they often recommended completing the project even when it was economically unwise to do so. While the effects of the project completion manipulation were surprisingly strong, the sunk-cost manipulation had virtually no effect. Implications of these results and directions for future research are discussed.**

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The present research examines judgments and preferences in "incremental investment situations" (Garland & Conlon, 1998), or situations in which an

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individual must decide whether to continue investing in a project that is already underway. Researchers in this area have consistently found, contrary to standard economic principles, that such decisions are influenced by sunk costs, or the amount already invested in the project (Arkes & Blumer, 1985; Garland, 1990; Garland & Newport, 1991). This finding is a specific instance of the well known “sunk-cost effect.”

A variety of psychological mechanisms have been hypothesized to underlie the sunk-cost effect (see Arkes & Blumer, 1985; Brockner, 1992; Garland, 1990; Staw & Ross, 1987; Thaler, 1980; Whyte, 1986). Recent work by Conlon and Garland (1993; Garland & Conlon, 1998) suggests, however, that all of these explanations may be moot in studies where sunk costs have been shown to affect incremental investment decisions (i.e., Arkes & Blumer, 1985, Experiments 3, 4, 5, and 8; Garland, 1990; Garland & Newport, 1991). The reason is that sunk costs have been confounded with “project completion,” or the degree to which the project is near completion, in *all* of these studies. Large sunk costs have consistently been paired with high project completion, whereas small sunk costs have been paired with low project completion. Consequently, it is possible that the effects observed in these studies were due to project completion rather than sunk costs and that any attempt to explain these results in sunk-cost terms is therefore moot.

Of course, sunk costs and project completion would be expected to covary in the real world. Nevertheless, as Garland and Conlon (1998) pointed out, these are conceptually distinct constructs that need to be separated in order to ascertain the real cause(s) of so called “sunk-cost” effects in incremental investment experiments. Garland and Conlon make a compelling case that project completion is not only a plausible alternative explanation for the effects observed in these experiments, but a likely one. Pointing to Lewin’s (1926, as cited in Ryan, 1970) notion of “task-tension” and evidence that the motive to complete a task strengthens as one gets closer to completion (Brown, 1948; Krech, Crutchfield, & Livson, 1967; Lewin, 1935; Miller, 1944), they argue that “If individuals are motivated to complete what they start and if this motive gets stronger as one gets closer to completion, then project completion may be a driving force behind individuals’ continued investment in projects that are already well underway” (p. 2027).

Conlon and Garland (1993; Garland & Conlon, 1998) conducted five experiments in which they crossed small versus large sunk costs with low versus high project completion. In every experiment, project completion had a substantial effect on subjects’ willingness to continue investing in the target project, whereas sunk costs had virtually no effect. As hypothesized, willingness to continue investing was stronger when project completion was high and weaker when project completion was low. Garland and Conlon (1998) argued that these results “suggest a potentially powerful new contributor to escalation phenomena that is worthy of more attention by researchers who are working in this area. We propose that as progress moves forward on a project, completion of the project itself takes increasing precedence over other goals (e.g., economic

profit) that may have been salient at the time the decision was made to begin the project” (p. 2042).

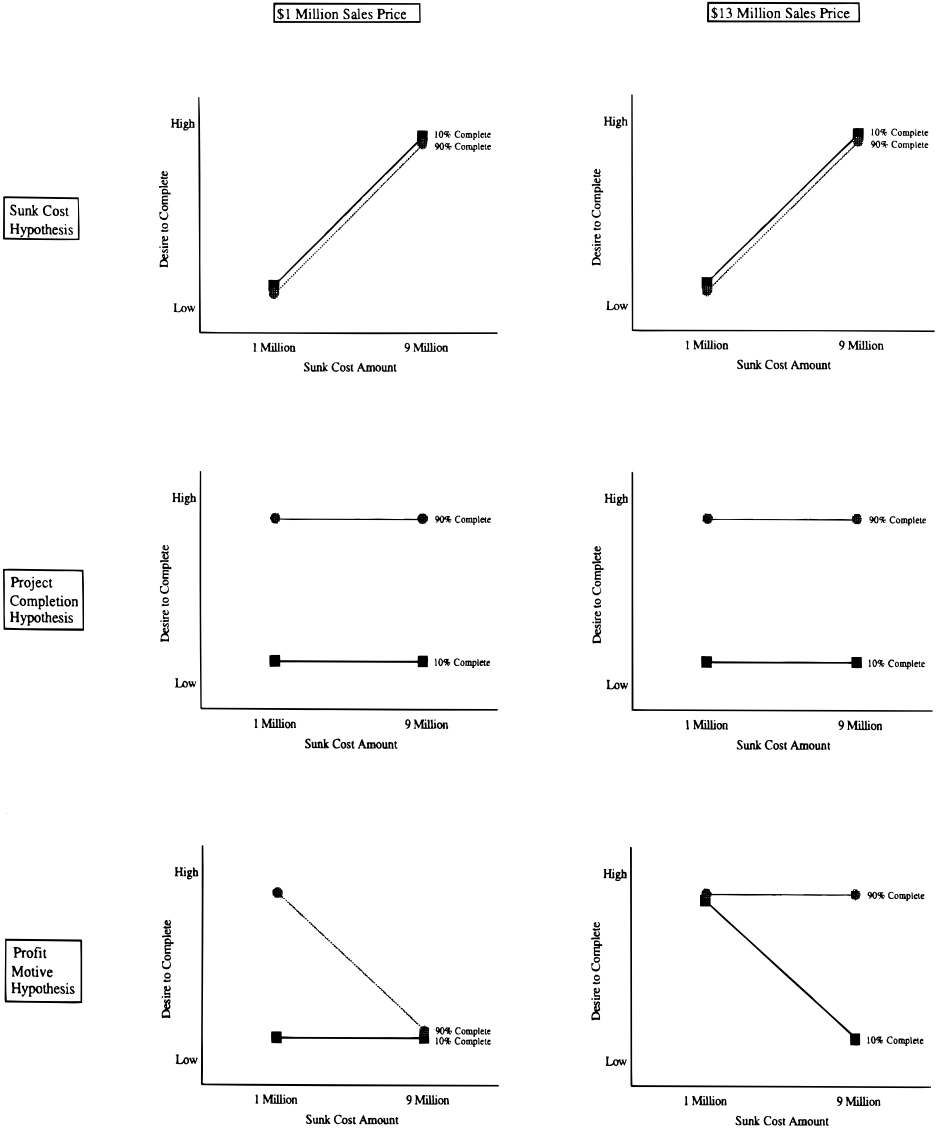
The latter proposition, that a completion motive takes increasing precedence over other goals as the project moves further along, provided the impetus for the present investigation. More specifically, we were curious as to whether project completion could really take precedence over *economic* concerns, as suggested by Garland and Conlon. It should be noted that there was no evidence in any of Conlon and Garland’s experiments that project completion motives ever took precedence over economic concerns. This is because their subjects were not told how much revenue the project would generate once it was completed. Without this vital piece of information, there was no way of calculating the economic value of the project. As there was no way of calculating this value, their subjects may have set aside any economic concerns and pursued the measurable goal of project completion instead.

Is the completion motive a “powerful” cause of escalation phenomena, as Conlon and Garland suggest? In our view, the answer to this question hinges on whether, and to what extent, project completion can take precedence over economic concerns. Thus, in an effort to address this question, we conducted an experiment in which we varied the anticipated *sales price* of the project along with sunk costs and project completion. By including this factor, we were able to examine whether the effect of project completion (if any) depended on the anticipated profitability of continued investment. We also wanted to see if project completion effects would prevail over sunk-cost effects, as they did in Conlon and Garland’s research, across different levels of anticipated sales price.

### *Competing Hypotheses*

To test the relative strength of the completion motive, we designed our experiment so as to pit three hypotheses against each other: the sunk-cost hypothesis, the project completion hypothesis, and what we call the “profit motive” hypothesis. As defined here, the sunk-cost hypothesis simply states that one’s desire to complete a project will depend only on the amount of money or effort already invested in the project; the more money or effort already invested, the greater one’s desire to complete the project. The project completion hypothesis predicts that this desire will depend entirely on how far along the project is; the closer the project is to completion, the stronger the desire to complete the project. Finally, the profit motive hypothesis holds that this desire will depend exclusively on whether the anticipated sales price exceeds the marginal cost of completing the project; the more the sales price exceeds this cost, the greater the desire to complete the project.

In the present experiment, each of these hypotheses predicts a different pattern of results. These competing predictions are shown in Fig. 1. In order to explain these predictions, some preliminary discussion of the experimental design is necessary. The design was a  $2 \times 2 \times 2$  factorial in which sunk costs (\$1m vs \$9m, where “m” denotes “million”), project completion (10% vs 90% complete), and anticipated sales price (\$1m vs \$13m) were completely crossed.



**FIG. 1.** Pattern of results predicted by each of the three competing hypotheses.

The predictions of each hypothesis are broken down in Fig. 1 by level of sales price. Note that the sunk-cost hypothesis predicts the same pattern of results across both levels of sales price and that the same is true of the project completion hypothesis. The profit motive hypothesis, on the other hand, predicts a different pattern at each level of sales price.

As shown in Fig. 1, the sunk cost and project completion hypotheses both predict that subjects will respond very simplistically to the investment scenario (at least by economic standards). The sunk cost hypothesis predicts that the desire to complete the project will increase solely with the amount of money already invested in the project, whereas the project completion hypothesis predicts that this desire will increase only as the percentage complete increases.

In contrast to these predictions, the profit motive hypothesis assumes that subjects will respond in a more sophisticated and economically rational way. This hypothesis predicts that subjects will consider both the amount already spent and the percentage complete to project how much it will cost to complete the project. This projected cost is then subtracted from the anticipated sales price to arrive at a projected gain/loss figure. According to this hypothesis, subjects will want to complete the project only if this figure is at least 15% larger than the marginal cost of completion, as such a gain would equal or exceed the opportunity cost of continued investment (i.e., subjects were given an investment alternative that they knew would provide a 15% gain).

The profit motive hypothesis assumes that subjects will combine sunk-cost and percentage-complete information in a straightforward (i.e., linear) manner to project the marginal cost of completion (MCC). More specifically, subjects are assumed to make the following projections: (1) when \$1m has been sunk and the project is only 10% complete, the projected MCC is \$9m, (2) when \$9m has been sunk and the project is 90% complete, the projected MCC is \$1m, (3) when \$1m has been sunk and the project is 90% complete, the projected MCC is only \$111,111, and (4) when \$9m has been sunk and the project is only 10% complete, the projected MCC is a whopping \$81m. Given these projected costs, when the anticipated sales price is, for example, \$1m, only the *\$1m sunk, 90% complete* condition would be projected to yield a large enough gain to warrant continued investment ( $\$1m - \$111,111 = \$888,889$ ); in each of the other three conditions, either a loss or no gain would be projected. Thus, as shown in the lower left panel of Fig. 1, when the anticipated sales price is \$1m, the profit motive hypothesis would predict a strong desire to complete the project in the *\$1m sunk, 90% complete* condition, and a weak desire in each of the other three conditions.

Note, in Fig. 1, that the project completion and profit motive hypotheses make the same predictions in six of the eight conditions and opposite predictions in the other two. In the *\$1m sales price, \$9m sunk, 90% complete* condition, the project completion hypothesis predicts that subjects will have a strong desire to complete the project because the project is nearly complete, whereas the profit motive hypothesis predicts a weak desire because continued investment is projected to be much less profitable (sales price - MCC =  $\$1m - \$1m = 0\%$  return) than the alternative investment (15% return). Both of these predictions are reversed in the *\$13m sales price, \$1m sunk, 10% complete* condition; here, the project completion hypothesis predicts that subjects will have a weak desire to complete the project because the project is barely underway, whereas the profit motive hypothesis predicts a strong desire because continued investment is projected to be much more lucrative (sales price - MCC =  $\$13m - \$9m = \$4m$ , which represents a 44% return on the marginal investment of \$9m) than the alternative investment (15% return).

It should be noted that, while the present research involved pitting the three aforementioned hypotheses against each other, our primary goal was to subject the project completion hypothesis to a stronger test than it has faced in the past. We did this, in part, by including the anticipated sales price manipulation,

as discussed above. Our other means of strengthening this test was to hold subjects accountable. That is, prior to responding to the investment scenario, subjects were told that they would have to explain to the experimenter their reasoning behind each of their responses. This sort of manipulation has consistently been shown to reduce decision-making errors by motivating subjects to respond in a more logically defensible manner (see Tetlock, 1985, 1992). Indeed, Simonson and Staw (1992) found that this form of accountability attenuated subjects' tendency to escalate (i.e., increase their investment in spite of negative feedback) when they were personally responsible for the initial investment decision.

Our reason for holding subjects accountable was not to stack the deck against the project completion hypothesis (although it did have this side effect). Rather, we were concerned that subjects might not be motivated enough to engage in the more complicated thought process necessitated by the profit-motive hypothesis and that they might conform to the project-completion (or sunk-cost) hypothesis simply by default. (As in previous sunk-cost and escalation research, the decision scenario was purely hypothetical; we were concerned that, because real outcomes were not at stake, subjects would be less motivated than they would be in an actual investment setting.) Thus, we held subjects accountable so as to increase the likelihood that they would be motivated enough to engage in the profit motive thought process, if they were so inclined.

Did we think that Conlon and Garland's project completion hypothesis would survive this more stringent test? Frankly, we were doubtful. As we show, however, the project-completion hypothesis withstood this test surprisingly well. We turn now to the experiment.

## METHOD

### *Participants*

One hundred and ninety-nine undergraduates from courses in business and psychology participated in exchange for course credit. The data from 8 subjects were excluded because their responses indicated that they did not understand the decision scenario, leaving 191 for analysis. Of these 191 subjects, 117 were female. The mean age was 24.5 years ( $SD = 6.79$ ).

### *Design and Procedure*

The design was a 2 (\$1m vs \$9m sunk cost)  $\times$  2 (10% vs 90% complete)  $\times$  2 (\$1m vs \$13m sales price) between-subjects factorial. The experiment was conducted in a classroom setting, and approximately 10–15 subjects were run in each session. Within each session, each subject was randomly assigned to one of the eight conditions. There were 22–25 subjects in each condition.

At the beginning of each session, written consent to be audiotaped was obtained from each subject. Subjects were told that some of them would be selected at random for an audiotaped interview, which would involve explaining

to the experimenter their reasoning behind each of their responses in the experiment (we did not tell them how many would be interviewed). Subjects were told that they would not receive course credit for the experiment unless they agreed to the interview. This is how subjects were held accountable. Ten percent of the subjects were randomly selected for the interview, and the interviews were actually conducted (i.e., there was no deception). The audiotaped responses were not analyzed.

After giving their consent to be audiotaped, subjects were given a written copy of the investment scenario. In contrast to Conlon and Garland's research, the investment scenario we used did not involve a research-and-development project, but rather a real estate development project, as in scenarios used by Northcraft and Neale (1986) and Heath (1995). We chose the latter because it was more conducive to a manipulation of anticipated sales price. Subjects were told to put themselves in the position described in the scenario, which read as follows:

You are an investment advisor for a commercial real estate development firm. The firm develops properties and then sells them. Your job involves monitoring and directing the allocation of funds throughout the course of these projects. Last year your firm undertook the development of a property for an indoor tennis club on your advice. A total allocation of \$10 million was initially set aside for the project.

Recently, you collected the following information on the progress of the tennis club project: 1) the project has incurred \$1 million (\$9 million) in costs to date, 2) engineers report that 10% (90%) of the project has been completed, and 3) upon its completion, the tennis club can be sold for \$1 million (\$13 million)—note that this is the gross amount of money your company will receive from the sale of the club; no costs have been deducted from this figure. [Note that points 1), 2), and 3) contain the sunk cost, project completion, and sales price manipulations, respectively.]

You must now decide whether to recommend continued investment or abandonment of the project. Your company will be paid the sales amount only upon completion of the project. If the project is not completed, your company will receive nothing. If you choose not to reinvest in this project, the \$9 million (\$1 million) that remains from the original allocation can be invested in other projects, yielding a return of 15%.

Because funds can be redirected from other projects or from a reserve fund in order to complete the tennis club, you need not limit your expenditures on this project to \$10 million. In other words, your total expenditures (i.e., the amount already spent plus the amount of additional spending, if any) may exceed \$10 million.

### *Dependent Measures*

After reading the scenario, subjects completed a questionnaire containing demographic items and the dependent measures. Our primary dependent measure was subjects' self-reported desire to complete the project, which was assessed with two items. These items asked subjects to rate the desirability of (1) completing the tennis club project and (2) *not* completing the project (both 7-point scales; 1 = very undesirable, 7 = very desirable; the second item was reverse-scored). Coefficient alpha for this *desire to complete* measure was .89.

Subjects were also asked to make a dichotomous *recommendation* about

whether to complete the project. They were told that any recommendation not to complete the project meant that no additional money would be spent on it.

Last, subjects responded to two items that asked them to rate (1) “how good of an investment you consider the tennis club project to be” (7-point scale; 1 = very bad, 7 = very good) and (2) “how positively or negatively you would evaluate the tennis club project as an investment” (7-point scale; 1 = very negative, 7 = very positive). Responses to these items were combined to form a single *goodness of investment* measure. Coefficient alpha for this measure was .93.

For each of the above items, subjects were asked to provide a written rationale explaining why they responded as they did. Our primary reason for obtaining written rationales was to reinforce the fact that some subjects would have to explain their responses to the experimenter (per the accountability stipulation).

## RESULTS

Given the design, the sunk-cost and project-completion hypotheses each predict a simple main effect on the desire to complete measures. The profit-motive hypothesis, on the other hand, predicts a main effect for each of the three factors, as well as a three-way interaction between these factors (see Fig. 1). To test for these effects, we used both ANOVA and logistic regression.

### *Desire to Complete*

A  $2 \times 2 \times 2$  ANOVA was conducted on the desire to complete measure (due to missing data for two subjects,  $N = 189$  for this analysis). There was a large project completion main effect on this measure [ $F(1, 182) = 79.00, p < .001, \eta^2 = .30$ ], with subjects in the high-project-completion condition ( $M = 5.42$ ) having a stronger desire than subjects in the low-project-completion condition ( $M = 3.33$ ). There was also a sales price main effect on this measure [ $F(1, 182) = 25.99, p < .001, \eta^2 = .13$ ]; as one would expect, subjects' desire to complete the project was weaker when the anticipated sales price was \$1m ( $M = 3.75$ ), as opposed to \$13m ( $M = 4.95$ ). There were no other effects on this measure. Although there were no interactions, cell means for the desire to complete measure are displayed in Fig. 2 for purposes of comparison to Fig. 1.

Clearly, the observed pattern of means and ANOVA results support the project completion hypothesis. Moreover, while the sales price main effect indicates that subjects were sensitive to the profitability of the project, they were not as sensitive as the profit motive hypothesis would predict; that is, there was no three-way interaction, and the observed pattern of means match the project-completion hypothesis more than they match the profit-motive hypothesis (see Fig. 1 and 2). Lastly, it should be noted that there was no sunk-cost effect whatsoever.

### *Recommendation*

A  $2 \times 2 \times 2$  logistic regression analysis was conducted on the dichotomous recommendation about whether to complete the project. Not surprisingly, the



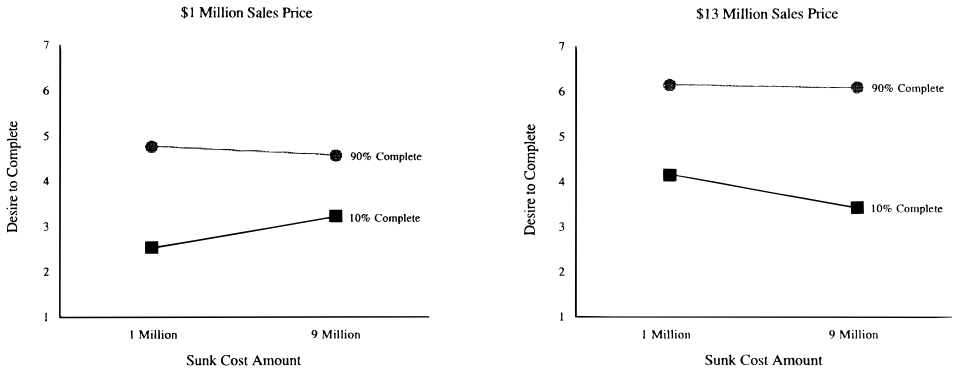


FIG. 2. Cell means for the desire to complete measure.

results for recommendation were very similar to those for desire to complete (the correlation between these two dependent variables was .84,  $p < .001$ ). Again, there was a strongly significant project-completion main effect [ $\chi^2(1) = 43.39, p < .001$ ], with 85% of those in the high-project-completion condition recommending completion, versus only 33% in the low-project-completion condition. There was also a significant, but smaller, effect for sales price [ $\chi^2(1) = 13.99, p < .001$ ]; when the anticipated sales price was \$1m and \$13m, 46 and 71% recommended completion, respectively. In contrast to the desire to complete measure, there was a significant three-way interaction on recommendation [ $\chi^2(1) = 4.00, p = .05$ ]. There were no other significant effects on this variable.

The percentage recommending completion in each cell is shown in Fig. 3. Although recommendations and desire to complete ratings were highly correlated, subjects were slightly more sensitive to expected profits when making a yes/no recommendation, and this sensitivity created the interaction (compare Fig. 3 with the profit motive portion of Fig. 1). However, this interaction was weak in comparison to the project completion main effect, as evidenced by the chi-square results and the pattern in Fig. 3. Thus, while these results provide

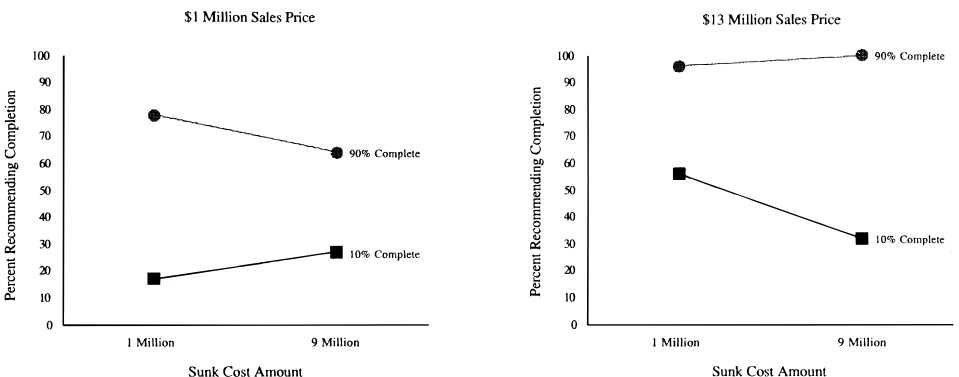


FIG. 3. Percent recommending completion in each condition.

some support for the profit motive hypothesis, they lend somewhat more support to the project completion hypothesis. Again, there was no support for the sunk-cost hypothesis.

### *Goodness of Investment*

As might be expected, in comparison to their desire to complete ratings, subjects' goodness of investment ratings were more sensitive to the profitability of the project. The project completion manipulation had a substantial effect on this measure [ $F(1, 184) = 38.54, p < .001, \eta^2 = .18$ ], but this effect was smaller than the effect of project completion on desire to complete ( $\eta^2 = .30$ ). Moreover, sales price had a larger effect [ $F(1, 184) = 52.71, p < .001, \eta^2 = .23$ ] on goodness of investment than project completion did, and this effect was larger than the effect of sales price on desire to complete ( $\eta^2 = .13$ ). There was also a sales price by project completion interaction [ $F(1, 184) = 6.82, p = .01, \eta^2 = .04$ ] and a sales price by sunk-cost interaction [ $F(1, 184) = 4.34, p = .04, \eta^2 = .02$ ] on goodness of investment, but these effects were small compared to the sales price and project completion main effects.

Simply put, in comparison to the project-completion manipulation, the sales price manipulation had more of an effect on subjects' perception of investment quality and less of an effect on their desire to complete the project. Thus, contrary to what might be expected (per research on cognitive consistency), these results indicate that investment quality perceptions and completion motives were not isomorphic [the correlations of goodness of investment with desire to complete and yes/no recommendation were  $.74$  ( $p < .001$ ) and  $.66$  ( $p < .001$ ), respectively].

It should be noted that the discrepancies in results between the desire to complete and goodness of investment measures could have been due, at least in part, to "compatibility effects" (this possibility was brought to our attention by an anonymous reviewer). According to the compatibility principle (see Slovic, Griffin, & Tversky, 1990; Tversky, Sattath, & Slovic, 1988), the amount of weight placed on a stimulus component is increased by its compatibility with the type of response elicited. Thus, when subjects were asked to rate their desire to complete the project, the degree of completion may have been more psychologically prominent than the projected profitability. On the other hand, when subjects rated investment quality, projected profitability may have been more prominent than the degree of completion. This could explain why the degree of completion had more effect on desire to complete and less effect on goodness of investment, whereas sales price had more effect on goodness of investment and less effect on desire to complete.

### *Qualitative Data*

Subjects' written rationales for their desire to complete ratings and their dichotomous recommendation were content-analyzed by three independent coders. Coders could not be kept blind to the experimental conditions because the

levels of sunk cost and project completion were often mentioned in the subjects' rationales. They were blind to the hypotheses, however. The coders read the desire to complete and recommendation rationales as a whole and made an overall judgment as to whether the subject's primary reason pertained to (1) profit maximization, (2) project completion, (3) sunk cost, or (4) other factors.

Each subject's rationales were independently categorized by two of the three coders. When a pair of coders disagreed, the "third" coder made an independent categorization so as to resolve the disagreement. In cases where all three disagreed, consensus was reached via discussion. Percentage agreement for each pair of coders was 73, 73, and 72%. Kappa for each pair was .59 ( $p < .001$ ), .56 ( $p < .001$ ), and .34 ( $p < .01$ ); it should be noted that a large majority (69%) of the rationales fell into one category (profit maximization), and this imbalance may have attenuated these reliabilities.

Across conditions, there were 78 (41%) subjects who recommended terminating the project and 112 (59%) who recommended completing it (there was missing data for one subject on this measure). Of those recommending termination, 74 (95%) gave profit-based reasons and 4 (5%) provided "other" reasons. Of those recommending completion, 57 (51%) gave profit-based reasons, 20 (18%) gave project completion reasons, 29 (26%) gave sunk-cost reasons, and 6 (5%) gave other reasons.

At first glance, the overall frequency of project completion rationales seems very low in view of the large project completion main effects observed. It must be noted, however, that the completion motive is thought to be activated only when a project is well underway (see Garland & Conlon, 1998). For this reason, project completion rationales would not be expected among subjects recommending termination (i.e., subjects would not be expected to cite a low level of project completion as their reason for termination; nor would they be expected to cite a high level of completion, as this would be a nonsensical basis for termination). Moreover, such rationales would be expected only in those conditions where the level of project completion was high. In the four conditions where the level of project completion was high, the relative frequency of completion rationales among those recommending completion was a bit higher, as 19 subjects (24%) gave this reason. Still, 41 (51%) of these subjects gave profit-based reasons, 18 (22.5%) gave sunk-cost reasons, and 2 (2.5%) gave other reasons.

Why were there so many profit-based rationales relative to completion rationales in the four conditions where the degree of project completion was high? One possibility is simply that projected profitability had more of an effect than is apparent in the ANOVA and graphical results reported earlier, thus lending greater support to the profit-motive hypothesis relative to the project-completion hypothesis. Another possibility is that the accountability stipulation affected subjects' rationales more than it influenced their ratings and recommendations. That is, in giving their rationales, some subjects may have exaggerated the extent to which economic considerations influenced their decisions because they thought this would sound good to the experimenter (some may have even thought this is what the experimenter was looking for). In other words, it

seems likely that the accountability stipulation itself may have created some experimental demand for profit-based rationales.

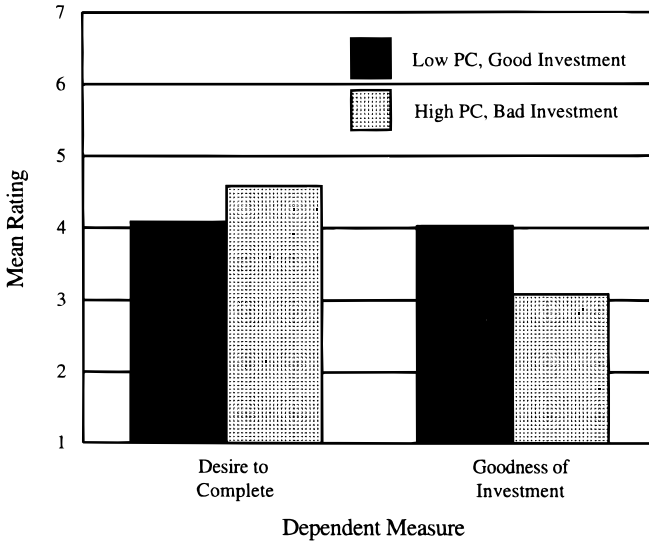
### *Comparison of Key Conditions*

As noted earlier, there were two conditions in which the project-completion and profit-motive hypotheses made opposite predictions: the *\$1m sales price, \$9m sunk, 90% complete* condition and the *\$13m sales price, \$1m sunk, 10% complete* condition. Because a 0% profit would be projected in the former condition and a 44% profit would be projected in the latter, the profit motive hypothesis predicts a weak versus strong desire to complete the project, respectively. The project completion hypothesis, on the other hand, makes the opposite prediction because the project is 90% complete in the former condition and only 10% complete in the latter (see Fig. 1). For expositional purposes, we refer to these as the *high PC, bad investment* and *low PC, good investment* conditions, respectively.

Figure 4 provides a visual comparison of the two conditions on the desire-to-complete and goodness-of-investment measures. Consistent with the project completion hypothesis, subjects in the *high PC, bad investment* condition ( $M = 4.6$ ) reported a stronger desire to complete the project than subjects in the *low PC, good investment* condition ( $M = 4.1$ ), but this difference was not statistically significant [ $t(42) = .87, p = .39$ ; the percentage of subjects recommending completion was also higher in the former condition (64%) than in the latter (57%), but again this was not a significant difference].

In contrast to the desire measure, a statistically significant difference was observed on goodness of investment. Consistent with the 0% projected return in the *high PC, bad investment* condition, subjects in this condition ( $M = 3.1$ ) judged the project to be a poor investment (recall that for the goodness items, 1 = very bad/negative, 7 = very good/positive). The ratings of subjects in the *low PC, good investment* condition ( $M = 4.0$ ) were higher [ $t(42) = 1.99, p = .05$ ], as would be expected. However, given the 44% projected return in this condition, these ratings were actually lower than what the profit motive hypothesis would predict (i.e., these ratings were neutral rather than positive).

The results for the *high PC, bad investment* condition are particularly noteworthy. In this condition, the desire-to-complete mean was somewhat positive (recall that for the desire items, 1 = very undesirable, 7 = very desirable), while the goodness-of-investment mean was negative (see Fig. 4). In other words, even though these subjects thought the project was a bad investment, they were nevertheless disposed toward completing it [incidentally, the desire-to-complete mean is significantly larger than the goodness-of-investment mean in this condition, within-subject  $F(1, 21) = 15.18, p = .001$ ]. This pattern clearly supports the project-completion hypothesis. Moreover, the written rationales of subjects in this condition were consistent with these results. Of the 14 subjects who recommended completing the project, 8 (57%) gave project-completion reasons, 4 (29%) gave sunk-cost reasons, and 2 (14%) gave other reasons; none of these subjects attempted to justify their decision on economic grounds



**FIG. 4.** Desire to complete and goodness of investment means for the two conditions in which the project completion and profit motive hypotheses made opposite predictions.

(indeed, any such justification would have been erroneous). On the other hand, all of the 8 subjects who recommended terminating the project cited poor returns as their reason for termination. Thus, for more than a third of the subjects in this condition, the goal of completing the project clearly did take precedence over economic concerns.

## DISCUSSION

### *Project-Completion Hypothesis*

As noted at the outset, the purpose of the present research was to subject the project-completion hypothesis to a stronger test than it has faced in past studies. Conlon and Garland argued that, as a project nears completion, the goal of completing the project becomes so strong that it can actually take precedence over economic objectives. However, those researchers did not put this claim to the test. In fact, the subjects in their experiments (Conlon & Garland, 1993; Garland & Conlon, 1998) had no way of determining the economic value of the target project because they were given no information about how much revenue the project would generate upon completion. Thus, one aspect of our stronger test involved giving subjects additional information that would allow them to calculate the economic value of the project under consideration; that is, in addition to being told how near the project was to completion and the amount of money already spent on it, our subjects were told what the project's sales price would be upon completion.

Another important aspect of our research involved holding subjects accountable. That is, at the time they responded to the investment scenario, participants understood that some of them would be chosen at random to explain to

the experimenter their reasoning behind their responses. Because this form of accountability has been shown to reduce decision-making errors (by way of preemptive self-criticism; see Tetlock, 1985, 1992), its inclusion in the present experiment strengthened our test of the project-completion hypothesis even further. Arguably, such accountability would be expected to tip the scales strongly in favor of the profit-motive hypothesis because the decision process it predicts is more logically defensible than basing one's decision on nearness to completion alone or sunk costs alone.

As it turned out, however, the project-completion hypothesis received considerable support. We were surprised by this finding. Together, the sales-price information and accountability stipulation created an inducement to engage in an economically rational decision process. Given this inducement, we were doubtful that the project-completion hypothesis would be supported. Not only have the present data removed this doubt, they have also convinced us that a "motive to complete" those projects that are well underway may indeed be a powerful contributor to escalation phenomena, as suggested by Garland and Conlon (1998). In our view, such a conclusion can no longer be regarded as premature.

### *Profit-Motive Hypothesis*

It should be noted that some participants were *not* unduly affected by a high degree of project completion. Indeed, in the critical *high PC, bad investment* condition, eight subjects (36%) recommended terminating the project, and all eight of these cited poor returns as their reason for termination. Moreover, as can be seen in Figs. 2 and 3, the data overall provide support for the profit motive hypothesis as well as the project completion hypothesis. We call attention to this aspect of our results so as not to overemphasize the effect of project completion. There was evidence of economic rationality here as well.

### *Sunk-Cost Hypothesis*

There was virtually no support for the sunk-cost hypothesis in the present study. This null finding, along with those of Conlon and Garland (1993; Garland & Conlon, 1998), strongly suggests that some of the sunk cost effects reported previously in the literature are spurious. That is, in studies where sunk costs have been confounded with the degree of project completion (i.e., Arkes & Blumer, 1985, Experiments 3, 4, 5, and 8; Garland, 1990; Garland & Newport, 1991), it is highly likely that the observed "sunk-cost" effects were really due to low versus high levels of project completion.

Lest readers will make too much of this lack of support for the sunk-cost hypothesis, we hasten to reiterate that the present research examined only incremental investment decisions, or decisions about whether to continue investing in a project that is already underway. Research on sunk costs has focused not only on decisions of this sort, but also on "resource utilization decisions" (Staw & Hoang, 1995), or decisions about which of two similar

resources to utilize. Because the latter involve intact resources, as opposed to projects underway, the notion of “project completion” does not even apply. Therefore, the null findings reported here do not cast doubt on sunk-cost effects observed on resource utilization decisions. Indeed, the available evidence suggests that these effects are quite robust (see Arkes & Blumer, 1985, Experiments 1, 2, 6, 7, 9, and 10; Staw & Hoang, 1995).

### *Goal-Substitution Process*

Consistent with Brockner, Shaw, and Rubin’s (1979) work on entrapment, Garland and Conlon (1998) speculate that incremental investment decisions in the real world may be characterized by a “goal-substitution” process. That is, projects are initially undertaken with the goal of economic profit in mind. As a project nears completion, however, the initial goal of economic profit is overtaken by the goal of project completion. They argue that, “In contrast to the sunk-cost hypothesis, goal substitution is not driven by past expenditures of money and effort; rather, it is driven by the belief that project completion is close at hand. In a sense, we argue that individuals get caught up in the desire to complete what they have started, and as this completion draws nearer, information that might have been taken into account before choosing to undertake the project (e.g., cost/benefit ratios, etc.) becomes increasingly unimportant” (p. 2042).

The results of the present study are consistent with this hypothesis. Our results suggest that, if a project is nearly complete, this nearness to completion can motivate continued investment even when the project’s economic prognosis is unfavorable. While this finding supports the goal-substitution hypothesis, it must be pointed out that this support is indirect. Direct evidence would require a longitudinal study in which decision makers who undertake a project for profit-making reasons are tracked over time to see if completion motives gain priority over economic concerns as the project nears completion. Thus, firmer conclusions about the viability of the goal-substitution hypothesis must await future research.

### *Limitations and Future Directions*

The most obvious limitation of this study is that the decision scenario was hypothetical. Although we held participants accountable in an effort to motivate thoughtful decision making, real-world investment situations are likely to be more involving than our decision task. Another limitation is that our participants were undergraduates with relatively little investment experience. For these reasons, one may legitimately question the generalizability of our findings to real-world investment settings. Moreover, for the very same reasons, field research on the project funding decisions of experienced investors would be of particular interest in this area. Longitudinal research that would allow a direct test of the goal-substitution hypothesis is also needed. Finally, it seems likely to us that personality would moderate the strength of one’s desire to complete

projects that are nearly finished. For example, individuals with high levels of certain traits subsumed under the dispositional category of conscientiousness (see Barrick & Mount, 1991), such as perseverance and task-orientation, may be the most susceptible to project-completion effects. Research along any of these lines would be particularly useful in furthering our understanding of escalation phenomena.

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