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ISOLATING THE EFFECTS OF CONTROL, CHOICE, AND PREDICTION

Michelle W. Langlois
University of Windsor

Kenneth M. Cramer
University of Windsor

Robin B. Mohagen
University of Saskatchewan

ABSTRACT

A reconceptualized model of control was investigated by considering whether those with control report higher ratings on control-associated measures, and those with prediction report higher ratings of prediction. Participants believed they would complete a task for a short or long time period based on either the participant or experimenter (choice/no-choice) selecting an envelope containing different or identical time periods (control/no-control). Before completing the dependent measures, some learned what time period they received. Regardless of prediction, those with control and choice reported higher ratings on control-associated measures than those with choice but no control, and those with neither choice nor control.

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INTRODUCTION

Most people desire considerable control over their lives; in fact, control may be more than simply a desire, but "an intrinsic necessity of life itself" (Adler 1930: 398). That we can control important outcomes is instrumental in the development of self-esteem, fulfillment of personal goals, and reduction of stress (Elliott, Trief and Stein 1986; Matheny and Cupp 1983; Mineka and Henderson 1985; Mineka and Kihlstrom 1978; Thompson 1981). Conversely, the absence of control increases the likelihood of learned helplessness (i.e., cognitive, motivational, and emotional deficits) and general physical illness (Lin and Peterson 1990; Peterson, Maier and Seligman 1993; Seligman 1975).

Traditional View of Actual Control

Despite the extensive benefits of control, debate still surrounds its definition and conceptualization. Traditional researchers (e.g., Alloy and Abramson 1979; Peterson 1993; Peterson et al. 1993; Seligman 1975) indicate that control exists when an outcome is more likely to occur given one response versus an alternative response. For example, if a child's hand is slapped every time he reaches into the cookie jar but not if he refrains, the slaps are controllable. On the other hand, if a child's hand is slapped regardless of whether he reaches into the cookie jar, the slaps are not controllable (Seligman 1975). Alloy and Abramson (1979) tested this conceptualization by providing participants with various degrees of actual control (0%, 25%, 50%, or 75%) over the onset of a light by pressing or not pressing a button. Consistent with the conceptualization, it was found that participants perceived more control if they actually had more control over the onset of the light. Similar findings are reported by Mikulincer, Gerber, and Weisenberg (1992), Tang and Critelli (1990), and Vázquez (1987; see also Alloy and Abramson 1988).

Confounding Control with Prediction

Despite widespread acceptance, some researchers believe the traditional conceptualization of "control is confounded by predictability in that having control over a stimulus also means that it is predictable" (Schulz 1976: 564). However, research in this area is problematic since "subjects provided with control over events characteristically have been accorded a large degree of predictability over the occurrence of those events as well" (Burger and Arkin 1980: 482). For example, Alloy and Abramson's (1979) participants may have felt control not because pressing or not pressing a button influenced whether the light came on (i.e., actual control) but because they anticipated (through feedback) whether the light came on (i.e., prediction).

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This confound can be illustrated by examining the four combinations that result from crossing prediction (2 levels: prediction, no-prediction) with control (2 levels: control, no-control). In Control/Prediction, people know the outcome and they influence it (e.g., expecting rainfall after cloud seeding). In No-Control/Prediction, people know the outcome but do not influence it (e.g., expecting a forecasted rainstorm). In No-Control/No-Prediction, people do not know the outcome and do not influence it (e.g., a sudden unexpected rainstorm). Finally, in Control/No-Prediction, people do not know the outcome but influence it. This final arrangement has been especially difficult for traditional theorists to conceptualize.

Some researchers have included a predictionless control condition but unfortunately, control and prediction still remain confounded. For example, Wortman (1975) had either participants or the experimenter choose a marble to determine the prize received. Unfortunately, all participants knew if they were receiving a prize before perceptions of control were measured. Burger and Arkin (1980) also attempted to include a predictionless control condition, again unsuccessfully. In this case, participants were not controlling and predicting the same outcome. Other researchers have omitted the predictionless control condition completely or replaced it with a No-Treatment condition because of conceptual difficulties (Geer and Maisel 1972; Schulz 1976; Tiggemann and Winefield 1987). Thus it becomes impossible to determine if the positive effects are attributable to control or prediction.

Although researchers are aware that prediction and control are confounded, many believe it is unfeasible to separate the two. According to Peterson et al. (1993: 58), "it is not at all clear, however, that control can be reduced to prediction. Nevertheless, there are many potential interactions between control and prediction, and they will not be easy to separate." As Seligman (1975: 128) concludes, "the problem of disentangling the effects of controllability from predictability may be next to logically impossible."

Redefining Control and Prediction

In an effort to rectify the control-prediction confound, Nickels, Cramer, and Gural (1992) suggest that these terms be redefined as independent of one another. Control, then, refers to "exerting an influence over which outcome will likely occur" (p. 160). For example, if a child can choose either of two hands in hopes of selecting the one hand that conceals a candy, there is control because the child will get a different outcome (candy or no-candy) depending upon the hand chosen. Conversely, there is no control if both hands conceal a candy (or both conceal no candy), because the child will get the same outcome regardless of the hand chosen.

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"Prediction refers to knowing which outcome will likely occur before it occurs" (Nickels et al. 1992: 159). To use the above example, if the child learns the outcome of his/her choice, then there is prediction because the child can anticipate the receipt of a candy. Under the conceptualization, the traditionally impossible condition of predictionless control is possible. Predictionless control exists if one hand conceals a candy and after choosing either hand, the child does not learn the result of that choice until after the assessment of perceived control.

The following examples of predictionless control help to illustrate the reconceptualization. If one orders a meal from a foreign language menu one does not understand, then one has control (i.e., one's choice makes a difference in the type of food that will arrive), but no prediction (i.e., one cannot anticipate exactly what food will arrive). Another example involves a TV remote control whose label has worn off. In this case, pushing a button will have some kind of effect (control), although it is unknown (unprediction) what that effect will be (e.g., volume can increase or decrease).

But Tiggemann and Winefield (1987: 254) argue that even if a predictionless control condition could be arranged, "it is hard to see how one could convince people that they are controlling outcomes they were unable to predict." To test this hypothesis, Nickels et al. (1992) had participants insert one of two plugs into a box that caused a device to cycle either faster or slower. One plug made the device cycle faster while the other plug made the device cycle slower, but the participant did not know which plug yielded which outcome. Participants would have to listen to aversive noise for the remainder of time on the device. Prior to plug selection, participants were randomly assigned to one of four conditions: Prediction/Control participants viewed the cycling numbers after selecting a plug; Prediction/No-Control participants viewed the cycling numbers after the experimenter flipped a coin to select a plug; No-Prediction/Control participants did not view the cycling numbers after selecting a plug; No-Prediction/No-Control participants did not view the cycling numbers after the experimenter flipped a coin to select a plug. Results showed that regardless of prediction, participants who chose their plug reported

more influence over listening time. Nickels et al. (1992, Experiment 2) confirmed these findings with identical experimental groups and measures of control, influence, responsibility, and lack of helplessness.

Confounding Control With Choice

Despite theoretically and empirically separating the effects of control and prediction (Nickels et al. 1992), their manipulation of control was still confounded with choice, whereby participants with control made a choice of plug, but participants with no control made no choice of plug. Thus, it is unclear whether enhanced feelings of control, influence, and responsibility are due to the level of actual control (i.e., veridical influence of the cycling speed) or choice (i.e., plug selection). Illusion of control advocates (Langer 1975; Wortman 1975) would challenge that the higher ratings of controllability in control participants are illusory, produced by the act of choosing the plug. More recent studies support the notion that regardless of actual control, participants given a choice show better coping and personal adjustment (Burleson, Kegeles and Lund 1990; Harchik et al. 1993).

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Paterson and Neufield (1995) suggest the confound is not between control and choice, nor between control and prediction, but rather among all three, whereby choice influences the amount of control one feels in anticipation of a stressful event. By manipulating the availability of information (prediction) about coping options in a fictitious stressful event, they examined the effects of anticipated stress and controllability in the selection of these coping options. Results showed that choice among coping options substantially increased perceived control and reduced stress when information was available, suggesting that the simple provision of nonproductive choice leads to neither increased perceptions of control nor reduced perceptions of threat.

Several studies have avoided the triple confound by holding one variable constant while manipulating the others. For example, Cramer, Nickels, and Gural (1997; see also Gural 1992) held choice constant, but manipulated prediction and control. Participants were informed that they would listen to aversive noise for the length of time determined by card positioning. Each subject was provided with a total of 24 cards that they were to place in either the A or B slot of the card positioner. Participants received a time reduction if a white square on the card was positioned opposite the card-reader photocell. Card position made no difference for cards with either two white or two black squares (no control). However, card position (which end of the card is placed in the slot) did make a difference for cards with one white and one black square (control).

Participants were informed whether their choice (A or B) would make a difference for each card. Participants were randomly assigned to one of twelve conditions derived by crossing three levels of prediction (Predicted Success, Predicted Failure, No Prediction) with four levels of control (0%, 25%, 50%, 75%). Predicted Success participants knew they received more than 13 time reductions, while Predicted Failure participants knew they received less than 11 time reductions. No Prediction participants did not know how many time reductions they received. Level of control (0%, 25%, 50%, 75%) was a percentage based on the number of cards the participant received with one white and black square (0, 6, 12, and 18 cards, respectively). Results showed

that regardless of prediction and with choice held constant, participants with no control felt less control, responsibility, influence, and more helplessness than participants with any amount of actual control (25%, 50%, or 75%), whose estimates did not significantly differ.

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Present Study and Hypotheses

Whereas Cramer et al. (1997) assessed the separate effects of control and prediction (with choice held constant), the first study investigated the same three-variable confound by holding prediction constant (no participants knew their outcome) and randomly assigning participants to one of the following three combinations of control and choice: Control/Choice, No-Control/Choice, and No-Control/No-Choice (same outcomes). Based on Alloy and Abramson (1979) and Nickels et al. (1992), it was hypothesized that even without prediction of outcome, participants with actual control will report higher control-associated measures (e.g., control, responsibility, influence, and lack of helplessness) than participants with no actual control. Moreover, based on Langer (1975) and Wortman (1975), it was hypothesized that even without prediction of outcome, participants with choice of option will report higher-control associated measures than participants with no choice of option.

EXPERIMENT 1

Method

Participants and Overview

Twenty-four male and 39 female Introductory Psychology students from the University of Saskatchewan participated in the experiment for partial course credit. Participants were divided into three groups with 8 males and 13 females in each group.

To decide how long they would each proofread technical medical manuscripts (either 2 or 20 minutes), some participants were given a choice between identical-looking envelopes containing cards which indicated either different or same time periods (denoting control and no-control circumstances). Other participants, given no choice, had the envelope (and thus proofreading time) selected by the outcome of an experimenter-flipped coin. Participants then filled out a questionnaire, which assessed the control-associated measures and manipulation checks.

Materials

The proofreading papers contained medical verbiage supposedly sampled from medical journal manuscripts. Two index cards with proofreading times ("2 minutes" or "20 minutes") lightly printed in pencil on the back were placed in envelopes ("LEFT" printed on one, "RIGHT" printed on the other). The proofreading times in either envelope were counterbalanced. A medium-sized white sign provided actual control information, and read either: "CARDS GIVE DIFFERENT PROOFREADING TIMES" or "CARDS GIVE THE SAME PROOFREADING TIMES." A Canadian dollar coin with a "LEFT" and "RIGHT" sticker on either side was also used.

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Independent and Dependent Variables

Using a between-subjects factorial design, participants were randomly assigned to one of three levels of the independent variable CONTROL. Control/Choice participants selected one of two envelopes containing different time periods, and were not told which was which. No-Control/Choice participants selected an envelope but were informed (by a sign) that the envelopes contained the same time period (either 2 or 20 minutes, but they were not told which). Finally, No-Control/No-Choice (same outcomes) participants had their envelope selected by the experimenter flipping a coin. Whereas the cards in this final condition could be either the same or different, it was decided that same-outcome cards would render this group identical to the No-Control/Choice group except for the element of choice. Following the manipulation, participants completed a dependent measures questionnaire assessing perceived prediction, control, influence, responsibility, and helplessness (e.g., "To what extent did you control how long you will proofread papers?"), each on a 10-point Likert scale (1 = "not at all", 10 = "to a great extent"). As a check of the experimental manipulations, participants indicated whether (a) they knew their proofreading time, (b) they chose the card, and (c) the cards indicated same or different proofreading times.

Procedure

In a testing room, individual participants were told they would proofread medical manuscripts for either a short period (2 minutes) or long period (20 minutes) of time, as determined by one of two cards selected by either themselves or a coin flipped by the experimenter. Participants were shown two identical-looking envelopes (but not the cards concealed inside), a sign informing whether the cards indicated identical or different proofreading times, a sample of the draft papers requiring extensive correction for spelling and syntax, and a master list of frequently misspelled words to use as a reference (e.g., "acetohexaide"). Participants in choice conditions selected one of the two envelopes by placing the coin on their choice, whereas participants in no-choice conditions observed the experimenter flip the coin and place it on the envelope indicated in the outcome of the coin flip. Participants completed the dependent measures questionnaire and the manipulation checks, following which the experimenter revealed that the participants would not have to proofread medical manuscripts, and explained both the procedure and expected results.

Results

Before the main analysis, participants were screened for their responses to the manipulation checks, all of which were successfully answered: Participants did not know their proofreading time, those with control indicated the cards produced different outcomes, and those with choice indicated that they (not a coin flip) selected the envelope. Having met the assumptions of analysis of variance, results showed no significant difference among the three levels of CONTROL for perceived prediction, $F(2, 60) = 2.84$, $p > .05$, $MSE = 5.91$.

Because each of the control-associated measures were moderately intercorrelated, a multivariate analysis of variance (MANOVA) with control, responsibility, influence, and helplessness as the dependent variables and CONTROL as the between-subjects factor was analyzed and found to be significant, $F(8, 114) = 2.38$, $p = .021$, $\omega^2 = 27\%$. Follow-up univariate analyses showed

significant effects for control, $F(2, 60) = 7.66$, $p = .001$, MSE = 8.43, $\omega^2 = 17.5\%$; influence, $F(2, 60) = 3.69$, $p = .031$, MSE = 8.48, $\omega^2 = 7.9\%$; and responsibility, $F(2, 60) = 8.13$, $p < .001$, MSE = 8.38, $\omega^2 = 18.5\%$; but not helplessness, $F < 1$. Newman-Keuls comparison procedures revealed that Control/Choice participants felt more control and responsibility than both No-Control/Choice and No-Control/No-Choice participants, whose ratings did not significantly differ. Moreover, a complex comparison showed Control participants felt more influence than No-Control participants, $F(1, 60) = 7.38$, $p = .009$, MSE = 8.48, $\omega^2 = 10.5\%$.

Discussion

Results confirmed the first hypothesis that participants with actual control (and choice) felt significantly more control, responsibility, and influence (but not any less helpless) than participants with no control, with or without choice. That the simple provision of a choice failed to produce higher ratings of perceived control in participants with no actual control disconfirmed the second hypothesis. Nonetheless, it can be concluded that to feel control, one's actions (e.g., choice of envelope) should make a difference in one's outcome (e.g., proofreading time). These results corroborate those of Nickels et al. (1992) and Paterson and Neufield (1995).

That no significant differences were found in perceptions of helplessness runs contrary to learned helplessness theory, which predicts that a lack of actual control is sufficient to produce emotional deficits (Peterson 1993; Peterson et al. 1993; Seligman 1975). Indeed, past studies have found significant decreases in helplessness with increases in actual control (Burger and Arkin 1980; Nickels et al. 1992; Tiggemann and Winefield 1987). However, whereas the present study withheld the outcome (i.e., proofreading time), past studies typically do not (Wortman 1975). As a result, the discrepancy between past and present findings may be in part explained by a negative relation between helplessness and prediction (Cramer et al. 1997). Because all participants in the present experiment were unable to predict their proofreading time, they may have all felt equally helpless, regardless of whether they chose options, or if choice of option made a difference in outcomes.

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A second experiment was conducted to examine the relationship between different levels of prediction and the control-associated measures. All three variables (control, choice, and prediction) were manipulated to assess their unique effects. The second study also considered individual differences in perceived control. Studies that have tested the new conceptualization of prediction, control, and choice have typically found small effects (Cramer et al. 1997). Recognizing that individual differences in one's desire and locus of personal control might account for a substantial proportion of the measurement variance, it was deemed useful to isolate and partial out these effects. Previous experiments (based on the general linear model) had assumed the differences were minimal and likely due to random assignment to groups; however, the covariance model ensures their effects are eliminated, reduces error variance, and increases power, and this results in larger effect sizes (Tabachnik and Fidell 2001).

Possible covariates include Desire for Control and Locus of Control. Desire for control is defined as "the extent to which people generally are motivated to see themselves in control of the events

in their lives" (Burger 1992: 6). As a personality trait, people can be placed along a continuum ranging from low desire for control to high desire for control (Burger and Cooper 1979). People also differ in the expectations they hold about things that happen to them, depending on whether they have an internal or external locus of control (Rotter 1966, 1971). An internal locus of control indicates "that an individual believes that he or she is responsible for the reinforcements experienced; in effect, that the person's actions, characteristics, qualities, etc. are prominent determinants of the experiences being queried" (Lefcourt 1991: 420). On the other hand, an external locus of control indicates "that the person views his or her outcomes as being primarily determined by external forces, whether they be luck, social context, other persons, or whatever" (Lefcourt 1991: 420).

Hypotheses

Based on the findings by Cramer et al. (1997), it was hypothesized that after accounting for individual differences in desire for control and locus of control, participants with Prediction will have higher ratings of prediction than participants without Prediction. Based on the findings by Cramer et al. (1997), Nickels et al. (1992), and Study 1, it was hypothesized that after accounting for the covariates, participants with Control will have higher ratings on the control-associated measures (perceived control, responsibility, influence, and lack of helplessness over outcome) than participants without Control (regardless of prediction). Furthermore, based on the findings of Study 1, it was hypothesized that after accounting for the covariates, participants in the No-Control/Choice condition and No-Control/No-Choice (same outcomes) condition will not differ significantly in ratings on the control-associated measures. Finally, based on the findings by Langer (1975) and Wortman (1975), it was hypothesized that after accounting for the covariates, participants in the No-Control/No-Choice (different outcomes) condition will have higher ratings on the control-associated measures than participants in the No-Control/No-Choice (same outcomes) and No-Control/Choice conditions. It was believed that participants in this final condition would have higher control-associated ratings because they had the potential for control because the envelopes contained different time periods; however, control was not present because the participant did not make the selection.

EXPERIMENT 2

Method

Participants

There was 34 male and 210 female Psychology students at the University of Windsor in Ontario who participated in the study for partial course credit.

Materials

Two index cards with the time periods ("2 minutes" or "20 minutes") printed on the back in light pencil were placed in envelopes with "LEFT" printed on one and "RIGHT" printed on the other. A large sign was used to provide control information to participants, reading either: "THESE ENVELOPES CONTAIN THE SAME TIME PERIOD" or "THESE ENVELOPES CONTAIN DIFFERENT TIME PERIODS." The experimenter used a small spinner which was divided in half, designating "L" for left and "R" for right envelopes and was colored blue and red,

respectively. A small, purple, ovoid stone was used to indicate the chosen envelope. Finally, a ¼ inch pile of papers with typewritten ambiguous letters was on a desk along with blank papers, a pencil, an eraser, and a timer.

Independent and Dependent Variables

Using a 4 x 3 between-subjects design, participants were randomly assigned to one of four levels of the first independent variable, CONTROL. Control/Choice participants selected one of two envelopes containing different time periods, and were not told which was which. No-Control/Choice participants selected an envelope but were informed (by a sign) that the envelopes contained the same time period (either 2 minutes or 20 minutes, but they were not told which). No-Control/No-Choice (same outcomes) participants had their envelope (which contained the same time periods) selected by the experimenter using a spinner. Finally, No-Control/No-Choice (different outcomes) participants had their envelope (which contained different time periods) selected by the experimenter using a spinner. The condition Control/No-Choice was omitted due to conceptual difficulties.

Participants were randomly assigned to one of three levels of the second independent variable, PREDICTED OUTCOME. Prediction/Success participants learned they received the short time period before completing the dependent measures. Prediction/Failure participants learned they received the long time period before completing the dependent measures. No-Prediction participants did not learn their time period before completing the dependent measures.

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Covariates

The covariate questionnaire contained Burger and Cooper's (1979) Desire for Control Scale and Rotter's (1966, 1971) Internal-External Locus of Control Scale. The questionnaire was completed in counterbalanced order. The Desire for Control scale consists of 20 statements (five items reversed prior to scoring) and participants were asked to indicate the extent to which the statements applied to them (e.g., "I enjoy making my own decisions"). The questionnaire uses a 7-point Likert scale (1= "The statement does not apply to me at all"; 7= "The statement always applies to me"). Higher scores reflect a greater desire for control. Research has demonstrated the necessary psychometric properties of internal consistency and test-retest reliability (Burger and Cooper 1979). In addition, the Internal-External Locus of Control Scale consists of 23-items plus 6 filler questions. Participants read a pair of statements and were asked to indicate which one they most strongly believed (e.g., "Many of the unhappy things in people's lives are partly due to bad luck" or "People's misfortunes result from the mistakes they make.") The scores range from zero (internal) to 23 (external) with one point being given for each external statement selected; consequently, higher scores reflect an external locus of control. Research has demonstrated the necessary psychometric properties of internal consistency and test-retest reliability (Rotter 1966).

The dependent measures questionnaire assessed perceived control, responsibility, influence, helplessness, and confidence (e.g., "How much control did you have in determining whether you work under the short or long time period?"), each on a 5-point Likert scale (1= "not at all", 5= "to a great extent"). As a check of the experimental manipulations, participants indicated: (a) if they knew their writing task time, (b) if they chose the envelope, (c) if the envelopes contained the

same or different time periods, and (d) the extent to which they wanted to receive the short time period.

Procedure

Tested individually in a private room, participants first completed the covariates questionnaire in counterbalanced order. Participants were informed that they would be rewriting several pages of ambiguous letters for either a short (2 minutes) or a long (20 minutes) period of time. Participants were informed that the study tests how concentration, visual acuity, and hand-eye coordination are influenced by how long one performs the task as determined by factors such as whether their choices matter.

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Participants were seated at a table with two identical looking envelopes (one marked "LEFT," the other "RIGHT"), a sign posted above the envelopes stating whether the envelopes contained the same or different time periods, and a pile of papers with strange arrangements of typewritten letters (e.g., "AAJEER"). Participants in choice conditions selected an envelope by placing a stone on their selection. Participants with no choice observed the experimenter use a spinner and place the stone on the envelope indicated on the spinner.

Prediction/Success and Prediction/Failure participants observed the experimenter open the selected envelope and show the index card with the time period printed on it. Participants were then asked to complete the dependent measures questionnaire before beginning the writing task. No-Prediction participants completed the questionnaire before learning their time period. Once the questionnaire was complete, participants learned that they did not, in fact, have to engage in the writing task and were debriefed as to the true purpose of the study.

Results

Before the main analysis, participants' responses to the manipulation checks were screened: (a) Do you know how long you will engage in the writing task? (b) Did you choose the envelope? and (c) Did the envelopes contain the same or different time periods? The experimental hypotheses and other relationships were tested at the .05 significance level through a MANOVA using Wilks' lambda. The covariates were not significantly correlated with the dependent variables and were excluded from the analysis. Results showed a multivariate main effect for CONTROL, $F (12, 606) = 8.14$, $p < .001$, $\omega^2 = 32.6\%$; but neither a significant multivariate main effect for PREDICTED OUTCOME, $F (8, 458) = .570$, $p = .802$; nor a significant multivariate interaction, $F (24, 800) = .767$, $p = .781$. ANOVAs were conducted on each dependent variable as follow up tests to the significant CONTROL multivariate effect. The ANOVAs on all four measures were significant: control, $F (3, 232) = 28.52$, $p < .001$, $MSE = 0.886$, $\omega^2 = 25.6\%$; influence, $F (3, 232) = 11.59$, $p < .001$, $MSE = 1.318$, $\omega^2 = 11.7\%$; responsibility, $F (3, 232) = 27.33$, $p < .001$, $MSE = 1.427$, $\omega^2 = 24.8\%$; and helplessness, $F (3, 232) = 7.79$, $p < .001$, $MSE = 1.553$, $\omega^2 = 7.9\%$.

Ryan-Einot-Garbriel-Welsch Multiple F comparison procedures (Ryan 1960) by CONTROL showed that Control/Choice participants felt more control, influence, and responsibility, but less

helplessness than participants in all other conditions, whose estimates did not significantly differ from one another. An equivalency test (Rogers, Howard and Vessey 1993) and multiple comparison procedures showed that No-Control/Choice and No-Control/No-Choice (same outcomes) participants felt equivalently helpless ($z = 2.86$, $p = .002$). While an equivalency test showed participants in these two condition were not equivalent on scores of control ($z = -1.14$, $p = 0.87$), responsibility ($z = -2.01$, $p = 0.98$), and influence ($z = -.064$, $p = 0.74$), multiple comparison procedures showed that they were not significantly different.

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Discussion

The second experiment extended the results of the first by (a) reducing error variance in individual differences, (b) manipulating prediction, and (c) including an additional variation of Control/Choice. Overall, parallel results indicated that prediction is not needed for perceived control.

It was recognized that individual differences in control-related personality variables may exist and should be accounted for in an effort to reduce error variance. Surprisingly, both personality variables, Desire for Control and Locus of Control, failed to extract a significant proportion of variance from the dependent variables. According to Burger and Cooper (1979), in the case of situations viewed as providing little or no payoff for control, there will be no difference in desire for control between high or low scorers. In the present experiment, although participants did indicate a stronger desire for the short time period, they possibly viewed this situation as yielding little payoff from greater control. Participants were led to believe they would engage in the writing task, whether it be for the short or long time period. This may also apply to Locus of Control. Future research should attempt to look at other personality traits that may affect perceptions of control such as self-efficacy, delay of gratification, self-esteem, and impulse control.

Although the covariates were not related to the dependent variables, results confirmed the first hypothesis that participants who could predict their time period were more confident about the outcome than those who could not predict their time period. This parallels previous results (Nickels et al. 1992). Results also confirmed the second hypothesis that participants with control and choice would have higher ratings on the control-associated measures than participants in all other conditions (regardless of prediction). This result corroborates the findings of Experiment 1, Cramer et al. (1997), and Nickels et al. (1992); and suggests that prediction is not necessary to yield feelings of control, responsibility, influence, and lack of helplessness.

Results only partially confirmed the third hypothesis. Participants' ratings of control, influence, and responsibility in the No-Control/Choice and No-Control/No-Choice (same outcomes) conditions were not significantly different by traditional tests, and they were not significantly equivalent by equivalency tests. According to Rogers et al. (1993: 561), these results are best considered inconclusive due to insufficient evidence. It should be noted, however, that in Experiment 1 no significant differences were found between these two conditions on the control-associated measures. Results showed that these participants did, however, report equivalent

ratings of helplessness, which suggests that the presence of a nonproductive or meaningless choice does not reduce feelings of helplessness.

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Finally, results failed to confirm the fourth hypothesis that by an illusion of control, participants in the No-Control/No-Choice (different outcomes) condition would have higher ratings on the control-associated measures than participants in the No-Control/No-Choice (same outcomes) and No-Control/Choice conditions, regardless of covariates. This suggests that an illusion of control (overestimating one's ability to influence the outcome; Langer 1975) was not induced in the No-Control/No-Choice (different outcomes) condition.

GENERAL DISCUSSION

Traditional theorists postulate that in order to have control one must have prediction; consequently, predictionless control is not feasible (e.g., Peterson et al. 1993; Seligman 1975; Tiggemann and Winefield 1987). The new conceptualization of control redefines these concepts, permitting the consideration of predictionless control. Two experiments addressed the confound among control, choice, and prediction under the new conceptualization of control (Nickels et al. 1992).

Both experiments showed that participants given a choice between options that yield different outcomes (but unknown) felt more control than participants given a choice between options that yield the same outcome. Congruent with past findings (Cramer et al. 1997; Nickels et al. 1992; Paterson and Neufeld 1995), these results provide further support for the reconceptualization. In short, the benefits of actual control only result when actions make a difference in the outcome. Merely providing a choice will not increase feelings of control and decrease feelings of helplessness unless it is known that choice of options will yield different outcomes, regardless of knowing what the outcome will be.

One may argue that higher ratings of perceived control among participants with control and choice were illusory rather than veridical, perhaps due to a choice between envelopes (Langer 1975). However, participants with choice but no control also made a choice between envelopes, but reported significantly lower ratings of control and higher ratings of helplessness, suggesting an illusion of that nature was not induced. Indeed, illusory control advocates are compelled to explain the necessary factors that would yield increases in control-associated ratings in the single group. If, as the present experiments report, it is due to neither choice nor prediction, then what in fact would induce the illusion?

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Uncovering differences in helplessness under the new conceptualization has been elusive. Whereas Experiment 2, Cramer et al. (1997), and Nickels et al. (1992) found that participants with actual control had lower ratings of helplessness than those with no actual control, Experiment 1 failed to uncover significant differences in helplessness among control conditions.

Because all participants in Experiment 1 were unable to predict the outcome, they may have all felt equally helpless regardless of whether they had either control or choice of options. In comparison, Cramer et al. (1997) manipulated prediction and found that participants unaware of the outcome felt more helpless than participants aware they received the desired outcome. Participants without prediction also felt comparable helplessness as participants aware they received the undesired outcome. This corresponds with the findings of Experiment 1, and suggests helplessness is equally high when the outcome either is unknown or known to be unwanted.

Limits and Future Research

We recognize that control was not completely crossed with choice. While some participants had choice but no control (envelopes contained identical time periods), no participant had control without choice. According to the new conceptualization, one may control an event or outcome "by affecting it, by contributing to it, by making an impact on it, or by bringing it about" (Nickels et al. 1992: 160), a definition that does not necessarily involve actions or behavior. Since this condition was excluded in the present investigations, it remains unknown if the observed benefits are attributable to having control alone or having both control and choice. As such, future research should consider how one could influence an outcome without a choice among options in an effort to address the following: How do we influence outcomes through factors (including height, sex, skin color) not by our own choosing? For example, an individual may influence the outcome of an interview simply by being female rather than male, black rather than white, or old rather than young. However, this presents unique challenges because of a renewed confound with prediction. For example, a female interviewed for a male-dominated job may predict she will not get the job because of her sex.

Future research should also consider one's awareness of choice. In the present experiments, participants were informed (by a clearly visible sign) whether their choice made a difference in the outcome. Would participants feel as much control had they been unaware the envelopes contained the same or different time periods? Suppose further that participants were unaware they were even making a choice. Outcomes may be determined by which one of two chairs a participant decides to sit in. Do people need to be aware that they are making a choice to reap the positive effects?

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That choice must make a difference in the outcome to increase feelings of control, responsibility, and influence and decrease feelings of helplessness may be applied to a host of domains. Consider a cancer patient given the opportunity to try a new drug. The drug may (a) destroy all liver tissue or (b) totally eradicate liver tumors. In this case, it is not the choice between treatments that yield feelings of control but the understanding that one's choice will make a difference in one's health (regardless of whether that outcome will be positive or negative). This finding may also have implications for therapy. For example, a therapist can increase a client's perceptions of control by pointing out all the choices that are made in a single day, even though these choices may be of only minor importance. Future research is left to build upon the present findings and ponder these issues further.

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AUTHORS' BIOGRAPHIES

Michelle Langlois is a Ph.D. student at the University of Windsor, Ontario, Canada. Her research interests include aging and adjustment to retirement. Email address: langlo2@uwindsor.ca

Dr. Kenneth M. Cramer is a personality-social psychologist at the University of Windsor in Windsor Ontario Canada. His research interests include person perception, implicit theories of personality, and instructional technology of introductory psychology. Email address: KCramer@uwindsor.ca

Robin Mohagen is a graduate student in educational psychology at the University of Saskatechewan. His research interests include control and predictability and educational counseling.