

Stressful events and controllability: An experimental test of the optimal matching model of
social support

by

Kelli Anne Gardner

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Program of Study Committee:
Carolyn E. Cutrona (Major Professor)
Daniel W. Russell
Susan E. Cross
Fred Lorenz

Iowa State University

Ames, Iowa

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Graduate College
Iowa State University

This is to certify that the master's thesis of

Kelli Anne Gardner

has met the thesis requirements of Iowa State University.

Signatures have been redacted for privacy

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ABSTRACT

The optimal matching model was tested in a laboratory setting. Female participants were told they would have to give an impromptu public speech to a small audience. Participants' sense of controllability over the speech was manipulated, and participants received either no social support, emotional support, or informational support. Participants' anxiety and support satisfaction were measured. Results did not support the optimal matching model. For anxiety, effects were small and in the opposite direction of predictions. For support satisfaction, participants in both the low control and the high control conditions were more satisfied with informational support than with emotional support, although this effect was small and stronger for the high control group.

INTRODUCTION

Most people want to help friends or loved ones cope with their problems, but it can be difficult to know the best way to be supportive. Although support providers are well intentioned and try to help, some supportive actions and statements are better received than others. One supporter's statement may be just what the sufferer needs to hear at that moment, whereas another supporter's statement may make the sufferer feel worse rather than better. How can one know what types of support will be most helpful to loved ones during a crisis? The optimal matching model of social support (Cutrona & Russell, 1990) addresses this very matter.

There are many different ways one can express support. Cutrona (1996) described five distinct types of social support. Emotional support is demonstrated through expressions of caring and concern. Esteem support involves bolstering the confidence, self-esteem, and perceptions of efficacy of the sufferer. Informational support is comprised of providing advice, information, or evaluative feedback. Tangible support entails providing either material assistance, like money, food or other goods, or performing beneficial physical actions, such as taking care of the stressed person's child, providing rides, preparing meals, etc. Network support includes making the sufferer feel that he or she belongs to a network of similar others who can both relate to the problem and also provide distraction through fun and recreation.

The optimal matching model (Cutrona & Russell, 1990) suggests that characteristics of the stressor determine what type of support will be most helpful. The model outlines four features of the stressor that influence which type of social support will be most effective. The most important of the stressor's features is controllability. Some stressors, like academic

problems, are relatively controllable. One can study more or hire a tutor to earn better grades, or drop a class that is especially troublesome. Such actions involve attempts to eliminate or reduce the stressor. Other events, like the death of a close loved one, are uncontrollable. In this instance, it is not possible to eliminate the stressor; one cannot change the fact that a loved one has died. All one can do is alleviate the negative emotions caused by the stressor.

How does the controllability of a stressor influence its optimal support match?

According to the optimal matching model, individuals facing relatively controllable stressors should benefit most from informational or tangible support. When people have some control over a stressor and its consequences, receiving relevant information, advice, and feedback can help them take actions to solve their problem. Emotional support, by contrast, should be less useful than informational or tangible support. Receiving expressions of affection, empathy and understanding are less likely to help people take action to solve their problem.

On the other hand, individuals facing relatively uncontrollable stressors should respond best to emotional and esteem support. People with no control over a stressor and its consequences can do little to change their fate. Therefore, expressions of caring and concern, while unable to change the stressor itself, will help to alleviate distress. Information, advice, or suggestions are less useful than emotional or esteem support, because they are less likely to soothe aversive emotions.

The optimal matching model was modeled after the goodness of fit and coping theory established by Lazarus and Folkman (1984). Goodness of fit is similar to the optimal matching model in that it predicts what particular types of behaviors are adaptive or maladaptive, depending on the controllability of the stressor. Goodness of fit differs from the

optimal matching model in it is concerned with the behaviors individuals use to cope with stressors, whereas the optimal matching model concerns what types of support individuals receive from others when coping with stressors. In the following section, the literature regarding the goodness of fit hypothesis will be reviewed, followed by literature regarding the optimal matching model.

Review of the Relevant Literature

Goodness of Fit and Coping

Before the optimal matching model was developed, the goodness of fit hypothesis linked the controllability of a stressor to the types of coping behaviors people use to deal with the stressor. There are two main coping responses people tend to use when grappling with a problem (Folkman & Lazarus, 1980). The first, problem-focused coping, involves efforts to directly change the problem itself. For example, an unemployed individual engaging in problem-focused coping would attempt to change the problem by finding a job. Reading the job advertisement section of the newspaper, submitting resumes, and going on job interviews are examples of problem-focused coping. Emotion-focused coping, the second type of coping, involves efforts to regulate the negative emotions the problem has caused.

Attempting to express and understand one's emotions or alleviate negative emotions through avoidance of the problem or reconceptualization (e.g. focusing on the positive) are examples of emotion-focused coping.

Lazarus and Folkman (1984) hypothesized that the controllability of a stressor helped determine which type of coping was best suited to the problem. Specifically, problem-focused coping was hypothesized to be adaptive for controllable situations and maladaptive for uncontrollable situations. Although taking action to improve a problem can provide a

psychological boost, futilely taking action to improve a problem that is not amenable to change may result in frustration, anger, and depression. By contrast, emotion-focused coping is hypothesized to be adaptive for uncontrollable situations and maladaptive for controllable situations. For a situation that is not amenable to change, accepting it, reconceptualizing it, and dealing with one's reaction to it are viewed as best. The optimal matching model and the goodness-of-fit hypothesis make similar predictions regarding how the controllability of a stressor affects how one should deal with it.

Although most people use both problem-focused and emotion-focused coping to deal with stressors (Folkman & Lazarus, 1985), the relative amount of each type of coping changes as a function of stressor controllability. Research supports the notion that individuals tend to alter how much of each type of coping they use based on how much control they perceive having over the situation. In several community samples, participants listed the most stressful event that had occurred to them recently. Then they indicated how much control they had over the stressor and which coping behaviors they had used to deal with the stressor. The higher the individual's perceived control over the stressor, the more likely he or she was to use problem-focused coping relative to emotion-focused coping (Folkman & Lazarus, 1980; Coyne, Aldwin, & Lazarus, 1981).

Another approach to testing the goodness-of-fit model is to create a stressful situation in the laboratory, manipulate its controllability, and observe if people tend to cope differently based on the controllability of the stressor. Studies in which participants complete difficult anagram tasks (Endler, Speer, Johnson, & Flett, 2000) and proofreading tasks (Zakowski, Hall, Klein, & Baum, 2001) have shown that perceived control over the experimental task is positively related to problem-focused coping and negatively related to

emotion-focused coping. The more control participants feel over the tasks they have been assigned, the more they attempt to attack the tasks with specific strategies.

It is evident that people tend to use emotion-focused coping to a greater degree for uncontrollable problems, and problem-focused coping to a greater degree for controllable problems. What do we know about the adaptability of fitting one's coping style to the problem at hand? Much of the literature that exists supports the use of problem-focused coping for controllable stressors but questions the adaptability of emotion-focused coping for both controllable and uncontrollable stressors. These studies typically assess a community population, allow them to select the most stressful event that occurred in a relatively short period of time, assess their perceptions of how controllable the stressor is, measure their type of coping, and then assess depression, anxiety, or psychological symptoms as an outcome variable. Two of these studies have found that emotion-focused coping is negatively related to mental health for both controllable and uncontrollable stressors (Masel, Terry, & Gribble, 1996; Conway & Terry, 1992).

However, two studies have provided support for the goodness-of-fit hypothesis. A study by Forsythe and Compas (1987) asked college students to separate their stressful events into daily hassles (e.g. performing poorly on a paper or exam) and major stressors (e.g. a family member's death or illness, adjusting to college life). Although goodness-of-fit was not supported for daily hassles, it was supported for major life events. If individuals appraised their major life event as uncontrollable, emotion-focused coping was related to lower symptomatology than problem-focused coping. If individuals appraised their major life event as controllable, problem-focused coping was related to lower symptomatology than emotion-focused coping. In another study that supports goodness-of-fit, an adolescent

sample listed their most recent academic and interpersonal stressors (Compas, Malcarne, & Fondacaro, 1988). The adolescents then brainstormed possible solutions for each problem and designated any solutions they had actually used to cope with the stressors. The students' self-reported emotional and behavioral problems varied with the match of controllability and problem-focused coping. If participants used few problem-focused coping strategies to deal with a stressor over which they had control, emotional and behavioral problems were high. If participants used many problem-focused coping strategies to deal with a stressor over which they had control, emotional and behavioral problems were low.

Another way researchers have tested the goodness-of-fit hypothesis is to recruit participants who have all experienced a particular stressful event. One study focused on a sample of women with breast cancer (Osowiecki & Compas, 1999) whereas another collected data from participants who had physical health, work, or family problems (Vitaliano, DeWolfe, Russo, & Katon, 1990). In both of these studies, when participants perceived their problems as controllable problem-focused coping was more effective at protecting mental health than emotion-focused coping. However, emotion-focused coping was maladaptive whether or not participants perceived their problems as controllable.

Another study examined hemodialysis as a stressor with both controllable and uncontrollable features (Christensen, Benotsch, Wiebe, & Lawton, 1995). Dialysis itself, a medical procedure in which a machine filters waste out of the blood, is run by medical staff and is completely uncontrollable by the patient. On the other hand, fluid intake, which must be carefully monitored due to the body's inability to filter fluid, is completely within the patient's control. IWG (interdialytic weight gain) is a good indication of how much fluid the patient has consumed between dialysis procedures. If a patient's IWG is above a

recommended level, it indicates that the patient has consumed more fluid than recommended. In Christensen et al.'s (1995) sample of hemodialysis patients, those who used problem-focused coping for fluid intake had lower IWG level's than patients who used an emotion-focused approach to fluid intake. Similarly, hemodialysis patients who used an emotion-focused approach in coping with the dialysis procedure had more favorable IWG levels than patients who used problem-focused coping with the dialysis procedure.

Another research design has focused on truly uncontrollable situations to examine the hypothesized link between emotion-focused coping and good mental health. An experiment by Strentz and Auerbach (1988) created a realistic hostage simulation. Before the hostage simulation, participants were trained in either emotion- or problem-focused coping. During the hostage simulation, participants were treated like real hostages; they were forced to be blindfolded and "shot" at with guns that looked and sounded real. Participants who had been trained in emotion-focused coping showed better psychological and behavioral adjustment during the hostage simulation. Other research assessed women who were attempting to become pregnant via in vitro fertilization (Terry & Hynes, 1998). According to Terry and Hynes (1998), in vitro fertilization is an uncontrollable situation because the probability of success for a given fertilization attempt is low, and hopeful parents can do nothing to increase the odds of success. Women who used emotion-focused coping during the in vitro fertilization attempt showed less depression and anxiety than women who used problem-focused coping, consistent with the goodness-of-fit model. Another study assessed how much control unemployed individuals felt they had over finding another job (Wanberg, 1997). For individuals who felt they had little or no control over finding another job, problem-focused approaches were negatively related to mental health. Emotion-focused

coping had beneficial effects on mental health regardless of the individual's perceived control over finding another job. The work of Strentz and Auerbach (1988), Terry and Hynes (1998), and Wanberg (1997) affirms emotion-focused coping's importance. Emotion-focused coping is related to positive outcomes in highly uncontrollable situations and problem-focused coping is not always the most adaptive response, as previous research (e.g. Vitaliano, DeWolfe, Maiuro, Russo, & Katon, 1990) might have suggested.

The goodness-of-fit hypothesis is parallel to the optimal matching model in three important ways. Social support can be thought of as encouragement to a stressed individual to cope in a particular way. Second, both goodness-of-fit and the optimal matching model focus on controllability of the stressor as a central component. Third, both theories suggest that behaviors intended to alleviate distress are better suited for uncontrollable stressors, whereas behaviors intended to attack the problem are better suited for controllable stressors.

Optimal Matching Research

There is mixed empirical support for the basic idea of optimally matched support types. For example, Cutrona, Cohen, and Igram (1990) performed an experiment in which participants read written vignettes about social support. In the vignettes, one of the character's mothers had been injured in an auto accident. The sufferer was said to desire either emotional support (a hug and company while packing for the trip home) or instrumental support (notifying the sufferer's professors and taking notes in the sufferer's classes). The other vignette character then offered support that either matched the sufferer's desires or did not match the sufferer's desires. After reading the vignettes, participants rated the helpfulness of the support provider's actions. Support that matched the sufferer's desires was always considered helpful. However, when the sufferer was said to desire instrumental

support and the supporter provided emotional support, participants' helpfulness ratings were high, indicating that emotional support can be an acceptable substitute for instrumental support. By contrast, participants did not consider instrumental support an adequate substitute for emotional support.

In other research, participants received social support before engaging in a difficult memory task (Haven, 1994). The demands of the memory task created two support needs: esteem support and informational support. Research assistants provided participants either esteem support (by telling them their performance was one of the top scores) or informational support (by teaching the participants a mnemonic trick to enhance memory). Haven (1994) operationalized the optimal match as the support type created by the anagram task that the participants did not receive. In other words, participants who received esteem support from the experimenter had an optimal match of informational support, and participants who had received informational support from the experimenter had an optimal match of esteem support. Next, participants received a second "dose" of support from the experimenter that was either the same type of support they had already received (redundant support) or the type of support they had not received (non-redundant support or optimally matched support). Participants who received optimally matched support showed better performance on a subsequent anagram task than participants who received non-optimally matched support. However, an alternative explanation for Haven's findings is that two types of support are simply more effective than one type, no matter how well matched the two types are to the characteristics of the situation.

A different research design involved a pair of strangers interacting in the laboratory (Horowitz et al., 2001). One participant disclosed a problem while the other listened to the

discloser and provided support. The discloser was instructed to describe either an agentic problem (concerning work or achievement) or a communal problem (concerning emotions or relationships). According to the optimal matching model, the optimal match for agentic problems is informational support whereas the optimal match for communal problems is emotional support. Supporters were instructed to respond with either informational or emotional support. This paradigm created four experimental conditions: Two in which the type of problem and type of support were matched, and two in which they were mismatched. Disclosers were more satisfied with the interaction when they received matched support. In addition, disclosers who received matched support had lower negative affect than did disclosers who received mismatched support.

Although neither the Haven (1994) nor the Horowitz et al. (2001) study manipulated or even measured controllability, they did follow the general spirit of the optimal matching model, finding that characteristics of a stressor (whether experimental or real) determine the more beneficial type of social support.

Controllability Research

Some researchers have provided a more stringent test of the optimal matching model by manipulating or measuring the controllability of a stressor and investigating the most beneficial support type for those experiencing the stressor. For example, 30 Chinese mothers of adult children with moderate or severe mental retardation were asked to rate the perceived controllability of stress in their lives (Chen & Tang, 1997). They also rated how much tangible, emotional, and informational support they received from both their families and the staff at a care facility for their children. Finally, they rated the usefulness of the support they received. If women perceived their problems as controllable, they preferred to receive

tangible support. However, the mothers reported that all forms of support were equally useful for uncontrollable stressors. The importance of controllability of the stressor in determining the optimal match was partially confirmed.

The optimal matching model was investigated with sample of married couples (Cutrona & Suhr, 1992). In an observational study conducted by Cutrona and Suhr (1992), partners discussed a current problem with their spouses while the spouses provided support. Trained observers rated the controllability of the problem the couple discussed. The interactions were videotaped so type of the support provided by the supporting partners could be observed and rated. Contrary to the theory's predictions, when disclosers felt they had control over their problems the amount of informational support they received correlated negatively with their satisfaction with the interaction. When spouses had a high level of control over the problem, however, the amount of informational support disclosers received correlated positively with their satisfaction with the interaction. The optimal matching model posits that having control over a stressor makes informational support adaptive, but in this study interaction satisfaction suffered when participants had control over the stressor and received informational support from their spouses. The amount of control the supporting spouses had was the determining factor; if supporters had control, information from them was well-received, whereas if supporters did not have control, information from them was ill-received. By contrast, emotional support was linked positively with marital satisfaction, no matter the controllability of the stressor.

Another study tested the optimal matching model in a sample of couples where one spouse had diabetes mellitus (Swanson-Hyland, 1996). Diabetic individuals completed measures assessing their perceptions of how much control they had over their diabetes, and

kept daily records of the type of support they received from their spouses for a week.

Tangible and informational support negatively predicted marital satisfaction for both high and low controllability diabetes sufferers; the optimal matching model suggests that for those with high control, tangible and informational support should be positively related to marital satisfaction. Emotional and esteem support, however, predicted marital satisfaction only for high controllability diabetes sufferers. It appears that, when spouses feel that they have control over the problems in their lives, they do not want tangible and informational support from their spouses. If people feel they have control over a situation already, they dislike receiving advice and suggestions from their spouses, which Cutrona and Suhr (1992) also found. However, in this study, emotional support was only beneficial among high controllability diabetes sufferers, whereas in Cutrona and Suhr's (1992) study, emotional support was beneficial for everybody.

Finally, Reich, Zautra, and Manne (1993) assessed internality (a variable similar to locus of control) and spousal support in a sample of women with rheumatoid arthritis. Patients' husbands were asked to characterize the support they provided to their wives as either self-reliant support, which encouraged wives to cope with the arthritis themselves, or other-reliant support, which encouraged wives to rely on others for help. Women with low perceived control whose husbands provided other-reliant support and women with high perceived control whose husbands provided self-reliant support received optimally matched support; their husbands' support corresponded with their level of perceived control. Women with high perceived control whose husbands provided other-reliant support and women with low perceived control whose husbands provided self-reliant support received mismatched support; their husbands' support failed to correspond with their level of perceived control.

Age moderated the relationship between matching and mental health outcomes. Contrary to optimal matching theory, results showed that when younger women (approximate ages 31-54) with low perceived control were encouraged to deal with the arthritis themselves, they had lower levels of depression, anxiety, and suicidal thoughts. However, consistent with optimal matching theory, if older women (approximate ages 55-77) with low perceived control were encouraged to deal with the arthritis themselves, they had elevated depression, anxiety, and suicidal thoughts. Receiving support that was at odds with their own preferred method of coping was harmful for a subset of the older women.

It should be noted that Reich, Zautra, and Manne (1993) assessed internality, a stable and trait-like measure of perceived control. Other optimal matching studies have considered individuals' beliefs about their ability to control a particular stressor. However, among older women, findings were consistent with optimal matching theory even with this more global conceptualization of control; older women told to rely on themselves for support, when they desired to receive support from others, showed deleterious mental health effects. This study suggests that one's sense of control over a particular stressor and one's sense of control in general may each have predictive value in determining the best types of social support to provide.

Overall, research on the optimal matching model has failed to find consistent support for the model. Part of the problem is that each of the studies uses a different dependent measure. Haven (1994) measured performance on an anagram task; Horowitz et al. (2000) measured affect; Cutrona, Cohen, and Igram (1990) measured helpfulness of hypothetical support in vignettes; Chen and Tang (1997) measured the support people prefer to receive; Cutrona and Suhr (1992) measured married couple's satisfaction with a specific support

interaction; and Swanson-Hyland (1996) measured global marital satisfaction. The optimal matching model theorizes about which types of support will be most effective in the event of a crisis; it is difficult to get a sense of the theory's empirical support when each of the investigations operationalizes support effectiveness differently.

The Current Study

The current study used a laboratory paradigm to test the optimal matching model. Participants were placed in a stressful situation, their perceptions of control over the stressful situation were manipulated, and they were provided with either optimally matched or non-optimally matched social support. It was hypothesized that participants who receive optimally matched support will demonstrate lower anxiety and higher support satisfaction than participants who receive non-optimally matched support.

Experimentally-manipulated level of controllability will be used to determine optimally matched and non-optimally matched social support. However, we will also examine the possibility that perceived control may be an individual difference variable that simultaneously influences the success of different types of support. In the coping literature, some studies have manipulated the controllability of situations, whereas other studies selected participants who were experiencing objectively high versus low controllability stressors. Other research has asked samples for subjective controllability ratings of the stressor in question. This research has shown some promise, with Reich, Zautra, and Manne (1993) finding that a lack of match between women's preferred style of coping and support from their husbands had a detrimental effect on the mental health of older women in the sample. Chen and Tang's (1997) study of mothers of mentally disabled adult children also showed that perceived controllability has predictive value; when mothers said their stress was

controllable, they preferred tangible support to emotional support. The current study not only manipulated control experimentally, but also measured participants' perceived control over the stressor. A measure of locus of control was added to see if a stable, trait-like measure of subjective controllability predicted how different types of social support influence satisfaction and affect, above and beyond control condition and perceived control over the stressor.

Three hypothesis were tested. The first hypothesis is that participants who receive support that is optimally matched to their control condition will have significantly lower anxiety and higher support satisfaction. The second hypothesis is that participants who receive support that is optimally matched to their trait level of control (as assessed by the locus of control measure) will have significantly lower anxiety and higher support satisfaction. The third hypothesis is that the combined effect of receiving support that matches both one's control condition and one's locus of control will account for variance above and beyond the individual effects of each type of control (i.e., there will be a three-way interaction between control condition, locus of control, and support type).

Emotional support should be the optimal match when control is low; expressions of caring and concern should result in lower anxiety and higher support satisfaction than informational support. Informational support should be the optimal match when control is high; informational support should encourage action and exerting control over the problem, resulting in lower anxiety and higher support satisfaction than emotional support.

METHOD

Design and Procedure

When participants arrived, they were told they would be preparing an impromptu speech and performing it for a small audience of psychology graduate students. In the low-control condition, participants were told, “This is the sort of task where it does not matter how you prepare. People are either good at giving impromptu speeches or they are not, and the way people prepare does not seem to affect their performance.” In the low control condition, participants were also told that they would be assigned a speech topic rather than choosing their own.

In the high-control condition, participants were told, “This is the sort of task where it really matters how you prepare. There is not a particular skill that makes people good at giving impromptu speeches, so the way people prepare really affects their performance.” In the high control condition, participants were also told that they could select their own speech topic.

Next, the participant was randomly assigned to the emotional support, the informational support, or the no-support control condition. Participants received support from a pre-recorded videotaped message. Five actresses each taped an emotional support message and an informational support message. The actresses delivered the supportive message directly into the camera, as if speaking to the participant. Multiple actresses were used to deal with sample stimuli concerns (Wells & Windschitl, 1999); if only one actress taped the supportive messages, it is possible that characteristics of that particular actress, and not the supportive messages, would be responsible for the effects that are found. Depending on which condition the participant was in, she watched the informational support video, the

emotional support video, or no video. If the participant was in the emotional or informational support condition, she was randomly assigned to an actress. The informational support script was as follows:

So, you're going to be giving a speech today. Let me see if I can help. First of all, you should try to make your speech personal. It's interesting to hear others talk about themselves, so try to add a personal example to illustrate your topic. Second, don't rush! Talk slowly and audibly. Even if it seems like you're talking a little too slowly, it's probably just right for the audience. People might lose interest if they can't understand you. Third, talk about your topic as if you think it's interesting, even if you don't. If you speak with expression in your voice, your audience will believe you are interested in what you're saying, and they'll be interested, too. Fourth, if you run out of things to say, first I would smile at the audience and take a moment to collect my thoughts. If nothing came to me to say after a few minutes, I would just thank the audience and act like that's where you intended to finish your talk—your audience won't know the difference. Finally, carry yourself with confidence. For a speech like this one, what you have to say may not be as important as how you say it. I think you should stand up straight, avoid fidgeting or excessive hand gestures, and make eye contact with your audience—all of these things will make you seem calm, cool, and collected, even if you're nervous on the inside. If you have a calm demeanor, people will believe that you really are calm, even if you're not.

So, to reiterate, five key pointers are: make your speech personal by either telling a story about yourself or adding a personal example to illustrate your topic, talk slowly

and audibly, speak with plenty of expression, if you run out of things to say, feel free to end your talk, and act confident even if you don't feel confident. Good luck!

The emotional support videotape script was as follows:

So, you're going to be giving a speech today. Let me see if I can help. First of all, we really appreciate your willingness to participate in this study. If it weren't for participants like you, we couldn't conduct psychological research here at Iowa State. Thanks so much for taking time out of your busy schedule to help us by being in our study.

Second, you should know that this is just a psychology experiment. I'm sure you're going to do just fine. In fact, Iowa State psychology students tend to do very well on this impromptu speech task. I've seen many of the speeches and they've all been terrific in the past, and yours will be terrific, too. There is no reason for you to be nervous or apprehensive.

If you are feeling a little bit nervous, that's totally natural. We sprung this whole speech thing on you at the last minute. We didn't let you know you were going to give a speech until you arrived today. You had no idea what was going to happen. You couldn't have been prepared for this. Anyone in your situation might feel a tad bit of nervousness.

I just want to encourage you to give the best speech that you can. If you get up in front of those people and give one hundred percent effort towards doing a great job, I'm sure everything will work out just fine. I am certain that you are going to walk into that room and just knock their socks off with your confident, excellent speech.

So remember, we really appreciate your participation in this experiment. Iowa State students have done really well on this task in the past, and you're going to do a great job, too. A little nervousness is understandable, given the situation we put you in, but there is no reason to be nervous because this isn't a big deal and you're going to do just fine! Good luck!

The experiment used a 2 (control condition: high or low) x 3 (support condition: no support, emotional support, or informational support) design. Six experimental conditions were created: two matched conditions (high control-informational support and low control-emotional support), two mismatched conditions (high control-emotional support and low control-informational support), and two conditions in which participants did not receive social support: a high control-no support condition and a low control-no support condition.

Participants

The undergraduate research pool at Iowa State University was used to recruit participants. Participants were recruited based on two criteria. First, only females were included in the study. A pilot study showed that males reacted with much less distress to the laboratory stressor than females. The purpose of producing a stressful event in the laboratory was to create mild anxiety, and the pilot study results indicated that this goal was achieved with female participants more than with male participants, so male participants were excluded from the study.

Also, participation in this study was restricted to women who did not have extensive previous public-speaking experience, such as prior participation on speech or debate teams or in a college-level speech class. We reasoned that novice public speakers would be more intimidated by giving a speech in front of a group of strangers. Second, we believed that our

manipulation of controllability was likely to work differently for participants with and without public speaking experience. Specifically, experienced public speakers are likely to interpret the low control condition differently than we intend. When participants are told impromptu public speaking is a task people are either good or bad at regardless of preparation, we wanted them to be doubtful about their ability. We reasoned that participants with public speaking experience are less likely to doubt their ability, because they will draw on their previous public speaking successes as proof of their “inherent” ability.

A mass testing session for students enrolled in entry-level psychology courses at Iowa State University was used to obtain a set of eligible participants. Mass testing participants were asked about their gender and their prior public speaking experience to determine their eligibility for the experiment. All 266 eligible women were invited, via telephone, to participate in the study; 143 women began the study, a participation rate of 53.8%. Of those 143 participants, seven elected to discontinue participation when they learned they would be expected to deliver an impromptu speech, two were ineligible because they had participated in an earlier form of the same experiment, and two did not complete the packets correctly.

The experimenters did not specifically probe for suspicion regarding whether the participant believed that she would actually be asked to give a speech. Some participants, who had just endured a moderately stressful situation, might have said they had prior knowledge about the study in order to save face, when they really did not. Experimenters did, however, observe each participant’s reaction upon receiving the debriefing. Most participants acted either surprised or relieved to learn that they would not be giving a speech after all; when a participant deviated from this pattern, the experimenter said “You don’t seem surprised that you’re not going to be giving a speech.” At that point, six participants

indicated that they had been suspicious about the experiment, and the data from these participants were eliminated from the analyses. Therefore, a total of 125 participants completed the study. Our sample was 90% Caucasian and 98% heterosexual, and eighty-three percent of participants were between the ages of 18-19. Participants' involvement in the experiment was compensated with one extra credit point in an introductory-level psychology class.

Measures

Independent variables

The participants first completed Rotter's Internal-External Locus of Control Scale (1966). The original scale consists of 24 forced-choice items that assess whether a person has an internal or external locus of control. An internal locus of control indicates that a person feels he or she can cause events in his or her life. An external locus of control reflects that a person feels that fate, luck, or other external factors cause events in his or her life. Rotter's Internal-External Locus of Control Scale has been used in a wide variety of empirical studies. The reliability of this instrument in this study ($\alpha = .72$) was similar to what has been found in other published reports, which have been shown to range from .69 (Franklin, 1963) to .79 (Rotter, 1963). The locus of control score was computed by dividing the number of items on which the participant chose the internal locus of control option to the total number of items the participant completed. A copy of the Internal-External locus-of-control scale has been included in Appendix A.

Manipulation checks

A brief manipulation check was administered to see if the control manipulation influenced participants' perceived control. The manipulation check was comprised of six

questions. The first item asked, “To what extent do you feel in control of your performance on this task?” with a Likert-type response format ranging from one indicating “not at all” to five indicating “extremely.” Next, participants completed five items in which a word describing high or low controllability was listed (capable, powerless, competent, weak, and defenseless) and the participant was asked to rate, on a one-to-five scale, how much she felt that word described her thoughts about performing the speech. These adjectives for feelings of being in control were modified from Faranda (2001). The perceived control manipulation check was found to be a reliable instrument ($\alpha = .91$).

There were also questions that asked participants how much informational, emotional, and esteem support they received from the videotape supporter. These questions were included to ensure that participants interpreted the support messages as intended. The questions were based on the Interaction Supportiveness Scale (Cutrona, Hessling, & Suhr, 1997; Cutrona, 1996). The questions asked participants how often the supporter (1) offered information and advice; (2) expressed caring, concern, or understanding; and (3) expressed belief in the participant's ability to give a good speech. The questions were answered on a Likert-type scale, with one indicating “never” and five indicating “very often”. Participants in the no-support conditions did not complete this manipulation check.

Dependent variables

Participants completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1987). The PANAS consists of descriptions of 20 different emotional states, and participants indicate how much that emotional state describes the way they currently feel on a Likert-type scale, with one indicating “very slightly or not at all” and five indicating “extremely”. The PANAS has been shown to be sensitive to experimental

manipulations, and is a valid measure of state-like fluctuations in mood when used with a specific set of instructions (Watson, Clark, & Tellegen, 1987). Four items from the PANAS (nervous, jittery, afraid, and scared) were compiled to create an anxiety measure, the dependent variable most relevant to this experimental paradigm. The anxiety subscale was reliable ($\alpha = .96$). The PANAS has been included in Appendix B.

Participants also completed a support evaluation form that was based on the 20-item Interaction Supportiveness Scale (Cutrona, Hessling, & Suhr, 1997; Cutrona, 1996). Three of the questions assessed general support satisfaction (“I am not satisfied with the support received from the videotape”—reversed, “I think the supporter provided high quality support”, and “I benefited from watching the videotape”) and were summed into a reliable support satisfaction scale ($\alpha = .83$). All questions were answered on a Likert-type scale, with one indicating “not at all” and five indicating “extremely”. The support evaluation form has been attached in Appendix C.

RESULTS

An error occurred during the running of participants, such that the design was unbalanced. Table 1 displays the number of participants in each cell.

Table 1: Number of participants in each experimental cell

	No support	Emotional support	Informational support	Total
Low control	25	21	14	60
High control	30	21	14	65
Total	55	42	28	125

A homogeneity of variance test was conducted to ensure that the variances of the two dependent variables were sufficiently homogenous to meet the assumptions of the analysis of variance test. Variance was homogenous for both anxiety (Levene's statistic 1.70, $p = 0.14$) and support satisfaction (Levene's statistic 0.07, $p = 0.98$). However, the relatively small number of participants who received informational support could adversely affect the ability to attain statistical significance in some tests. The issue of statistical power will be discussed in more detail below.

Manipulation checks

The control manipulation was effective in influencing participants' sense of control; participants in the low control condition had a lower mean score on the perceived control scale ($M=2.74$, $SD = 0.67$) than participants in the high control condition ($M=3.21$, $SD = 0.79$; $t(127) = -3.57$, $p = .001$).

Turning next to the support condition manipulation check, scores on the perceived support items differed significantly by condition. Participants who watched the emotional

support message said their supporters were higher in “expressed caring, concern, sympathy, and understanding” ($M = 4.3$, $SD = 0.80$) than participants who watched the informational support message ($M = 3.3$, $SD = 0.95$; $t(71) = 4.86$, $p < .001$). Participants who watched the emotional support message said their supporters were higher in “expressed belief in my competence or ability to give a good speech” ($M = 4.7$, $SD = 0.61$) than participants who watched the informational support message ($M = 3.4$, $SD = 1.07$; $t(71) = 6.47$, $p < .001$). Participants who received informational support said they were “offered information, advice, or suggestions about public speaking” to a greater degree ($M = 4.8$, $SD = 0.48$) than participants who received emotional support ($M = 2.61$, $SD = 1.43$; $t(71) = -8.06$, $p < .001$).

The correlations among the key study variables are presented in Table 2. Locus of control was positively correlated with perceived control; the higher a participant's internal locus of control, the more control she felt over giving an impromptu speech. Locus of control and perceived control were both negatively correlated with anxiety; the more control a participant felt she had, the less anxious she was about giving an impromptu speech. Finally, support satisfaction was positively correlated with perceived control and negatively correlated with anxiety. Participants who felt a high level of control over giving an impromptu speech were more satisfied with the support they received, and they felt less anxious about it.

Table 2: Correlations among study variables

	Locus of control	Perceived control	Anxiety	Support Satisfaction
Locus of control	1.00			
Perceived control	.27*	1.00		
Anxiety	-.18*	-.60*	1.00	
Support satisfaction	.17 ^a	.36 ^{*a}	-.32 ^{*a}	1.00

^a For these correlations, $n = 73$; for all other correlations, $n = 125$

Note: Correlations with an asterisk are significant, $p = .05$.

Tests of hypotheses

Anxiety

A multiple regression analysis was conducted to predict anxiety from control condition and support condition (see Table 3). In Step 1, control condition (the low control condition was the omitted reference group) and support type (for both codes, the no support condition was the omitted reference group) were entered into the equation. Neither of the main effects was statistically significant ($.38 < p's < .72$). The variables in step 1 accounted for .8 percent of the variance in anxiety.

In Step 2, the interaction between the control condition and each of the support types were added to the model. The interaction terms were computed by multiplying the dummy code for control condition by the dummy codes for emotional and informational support. None of interaction terms significantly predicted anxiety ($.51 < p's < .71$). The variables added in Step 2 accounted for an additional .8 percent of the variance in anxiety.

Table 3: Control and support predicting anxiety

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1					
	High control condition	0.07	0.03	0.36	.72
	Emotional support	-0.22	-0.09	-0.88	.38
	Informational support	-0.10	-0.04	-0.37	.71
Step 2					
	High control condition	0.06	0.02	0.17	.87
	Emotional support	-0.13	-0.05	-0.35	.73
	Informational support	-0.29	-0.10	-0.73	.47
	High control x emotional support	-0.19	-0.06	-0.38	.71
	High control x informational support	0.37	0.10	0.66	.51

Note. $n = 125$. $R^2 = .008$ for Step 1 ($p = .82$); $\Delta R^2 = .008$ for Step 2 ($p = .63$).

Although none of the predictors attained statistical significance, means and standard deviations were computed for each cell of the experiment to examine the pattern of results. As Table 4 indicates, in the low control condition participants who received no support were the most anxious and participants who received informational support were the least anxious. Participants in the low control condition were more anxious if they received emotional support than if they received informational support; however, this effect was small ($d = -.14$) by Cohen's (1992) criteria. The optimal matching model predicts that, in the low control condition, participants who received emotional support should be the least anxious. In the high control condition, participants who received informational support were the most anxious and participants who received emotional support were the least anxious; however, this effect was small to moderate ($d = .31$) by Cohen's criteria. The optimal matching model

predicts that, in the high control condition, participants who received informational support should be the least anxious.

Table 4: Means and standard deviations for anxiety by control and support conditions

	No support		Emotional support		Informational support	
	m	sd	m	sd	m	sd
Low control	3.47	(1.09)	3.35	(1.27)	3.18	(1.07)
High control	3.53	(1.17)	3.21	(1.47)	3.60	(1.00)

Next, a multiple regression analysis was conducted to predict anxiety from locus of control and support condition. These results are shown in Table 5. In Step 1, the direct effects for locus of control (with a higher score indicating a more internal locus of control), control condition (the low control condition was the omitted reference group), and emotional and informational support were entered into the model (for both codes, the no support condition was the omitted reference group). There was a statistically significant main effect for locus of control; the more internal a participant's locus of control, the less anxiety she felt about giving an impromptu speech. None of the other main effects were statistically significant ($.32 < p's < .62$). The variables in Step 1 accounted for 4.1 percent of the variance in anxiety.

In Step 2, the interaction between locus of control and both types of support and the interaction between locus of control and control condition were added to the equation. Neither of the two-way interaction terms attained significance ($.17 < p's < .53$). The variables in Step 2 accounted for an additional 1.6 percent of the variance in anxiety.

In Step 3, the three-way interaction between locus of control, control condition, and both types of support was added to the model. None of the three-way interaction terms attained significance ($.55 < p's < .83$). The variables in Step 3 accounted for an additional .3 percent of the variance in anxiety.

Table 5: Locus of control and support predicting anxiety

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1	Locus of control	-1.35	-0.18	-2.06	.04
	High control condition	0.11	0.05	0.51	.61
	Emotional support	-0.24	-0.10	-0.99	.32
	Informational support	-0.14	-0.05	-0.50	.62
Step 2	Locus of control	-2.21	-0.30	-1.78	.08
	High control condition	0.55	0.23	0.73	.47
	Emotional support	-1.06	-0.42	-1.22	.22
	Informational support	-1.48	-0.53	-1.46	.15
	Locus x emotional support	1.54	0.35	0.98	.33
	Locus x informational support	2.58	0.50	1.38	.17
	Locus x high control condition	-0.88	-0.22	-0.63	.53
Step 3	Locus of control	-2.17	-0.30	-1.73	.09
	High control condition	0.53	0.22	0.69	.49
	Emotional support	-1.08	-0.43	-1.24	.22
	Informational support	-1.42	-0.51	-1.38	.17
	Locus x emotional support	1.49	0.34	0.91	.37
	Locus x informational support	2.12	0.41	1.04	.30
	Locus x high control condition	-1.03	-0.25	-0.71	.48
	Locus x high control x emotional support	0.19	0.03	0.21	.83
	Locus x high control x informational support	0.62	0.10	0.60	.55

Note. $n = 125$. $R^2 = .041$ for Step 1 ($p = .28$); $\Delta R^2 = .016$ for Step 2 ($p = .57$); $\Delta R^2 = .003$ for Step 3 ($p = .84$).

An additional multiple regression analysis was conducted to predict anxiety from perceived control (as measured by the control manipulation check) and support condition. Although the perceived control score was not included in any of the hypotheses, it is the most accurate measure of the participant's feelings about the controllability of the impromptu speech task. First, a regression analysis was conducted to see if locus of control and control condition significantly predicted perceived control. These results are shown in Table 6. In Step 1, the direct effects of locus of control and control condition were entered into the model. Both direct effects were statistically significant ($p < .01$). Participants with a more internal locus-of-control had higher perceived control than participants with a more external locus-of-control. Participants in the high control condition had higher perceived control than participants in the low control condition. The variables in Step 1 explained 15.7 percent of the variance in perceived control.

In Step 2, the interaction between locus-of-control and control condition was added to the model. The interaction was not statistically significant ($p = .31$). The variables added in Step 2 accounted for an additional .7 percent of the variance in perceived control scores.

Table 6: Locus of control and control condition predicting perceived control

	<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1				
Locus of control	1.21	0.25	3.06	.01
High control condition	0.44	0.29	3.53	.01
Step 2				
Locus of control	0.80	0.17	1.44	.15
High control condition	0.02	0.01	0.05	.96
Locus x high control condition	0.80	0.30	1.02	.31

Note. $n = 125$. $R^2 = .157$ for Step 1 ($p < .01$); $\Delta R^2 = .007$ for Step 2 ($p = .31$).

Perceived control was tested as a predictor of anxiety due to the lack of statistically significant effects for control condition. These results are shown in Table 7. In Step 1, the direct effects of perceived control, control condition (the low control condition was the omitted reference group), and support type (for both codes, the no support condition was the omitted reference group) were entered into the model. There were statistically significant main effects for both perceived control and control condition. Participants with higher perceived control felt less anxiety about giving an impromptu speech ($p < .01$). However, controlling for perceived control, participants in the high control condition felt more anxiety than participants in the low control condition about giving an impromptu speech ($p < .01$). This main effect for control condition was not unexpected; overall, the high control condition participants were slightly more anxious ($M = 3.44$, $SD = 1.23$) than participants in the low control condition ($M = 3.36$, $SD = 1.14$) although this difference is not statistically significant ($t(124) = -0.4$, $p = .69$). None of the other effects were statistically significant ($.24 < p's < .85$). The variables in Step 1 accounted for 42.3 percent of the variance in anxiety.

In Step 2, the interaction between the perceived control score and support types and the interaction between perceived control score and control condition were added to the model. None of the interaction terms significantly predicted anxiety ($.20 < p's < .93$). The variables added in Step 2 accounted for an additional 1.5 of the variance in anxiety.

In Step 3, the three-way interaction between perceived control score, control condition, and support types were added to the model. None of the interaction terms significantly predicted anxiety ($.44 < p's < .73$). The variables added in Step 3 accounted for an additional .3 percent of the variance in anxiety.

Table 7: Perceived control and support predicting anxiety

	<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1				
Perceived control	-1.03	-0.68	-9.33	.01
High control condition	0.56	0.24	3.26	.01
Emotional support	-0.22	-0.09	-1.18	.24
Informational support	-0.04	-0.01	-0.19	.85
Step 2				
Perceived control	-1.22	-0.80	-5.79	.01
High control condition	-0.19	-0.08	-0.27	.79
Emotional support	-0.19	-0.08	-0.27	.79
Informational support	-1.45	-0.52	-1.29	.20
Perceived control x emotional support	-0.02	-0.02	-0.09	.93
Perceived control x informational support	0.47	0.52	1.28	.20
Perceived control x high control	0.25	0.37	1.11	.27
Step 3				
Perceived control	-1.18	-0.77	-5.27	.01
High control condition	-0.19	-0.08	-0.27	.79
Emotional support	0.01	0.01	0.01	.99
Informational support	-1.37	-0.49	-1.18	.24
Perc control x emotional support	-0.14	-0.18	-0.52	.60
Perc control x informational support	0.41	0.46	1.03	.31
Perceived control x high control condition	0.21	0.30	0.89	.38
Perc control x high control x emo support	0.11	0.12	0.78	.44
Perc control x high control x info support	0.05	0.04	0.35	.73

Note. $n = 125$. $R^2 = .423$ for Step 1 ($p < .01$); $\Delta R^2 = .015$ for Step 2 ($p = .39$); $\Delta R^2 = .003$ for Step 3 ($p = .74$).

Support satisfaction

Turning next to support satisfaction, a multiple regression analysis was conducted to predict support satisfaction from control condition and support condition. These results are shown in Table 8. In Step 1, the direct effects for control condition (the low control condition was the omitted reference group) and support type (the support satisfaction questionnaire was only answered by participants who received support, so informational support was the omitted reference group) were entered into the model. There was a statistically significant main effect for emotional support; participants who received emotional support were less satisfied than participants who received informational support. The main effect for control condition was not statistically significant ($p = .44$). The variables in Step 1 accounted for 10 percent of the variance in support satisfaction.

In Step 2, the interaction term between control condition and type of support was added to the model. The interaction did not significantly predicted support satisfaction ($p = .27$). The variable added in Step 2 accounted for an additional 1.6 percent of the variance in support satisfaction.

Table 8: Control and support predicting support satisfaction

	<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1				
High control condition	-0.13	-0.09	-0.78	.44
Emotional support	-0.48	-0.31	-2.71	.01
Step 2				
High control condition	0.09	0.07	0.36	.72
Emotional support	-0.28	-0.18	-1.09	.28
High control x emotional support	-0.39	-0.23	-1.10	.27

Note. $n = 70$. $R^2 = .10$ for Step 1 ($p < .05$); $\Delta R^2 = .016$ for Step 2 ($p = .27$).

Although the control by support interaction did not attain statistical significance, means and standard deviations were computed for each cell of the experiment to examine the pattern of results. The optimal matching model predicts that in the low control condition, participants should be more satisfied with emotional support than with informational support. By examining Table 9, it is clear that participants preferred informational support to emotional support in both control conditions. The optimal matching model predicts that in the high control condition, participants should be more satisfied with informational support than with emotional support. Table 8 shows that this was the case; participants in the high control condition preferred informational support to emotional support (Cohen's $d = .84$). However, the optimal matching model also predicts that in the low control condition, participants should be more satisfied with emotional support than with informational support, yet participants clearly preferred informational support (Cohen's $d = .42$).

Table 9: Means and standard deviations for support satisfaction by control and support conditions

	Emotional support		Informational support	
	m	sd	m	sd
Low control	3.26	(0.66)	3.54	(0.66)
High control	2.97	(0.82)	3.64	(0.77)

A multiple regression analysis was conducted to predict support satisfaction from locus of control and support condition. These results are shown in Table 10. In Step 1, the direct effects of locus of control (with higher scores indicating a more internal locus of control), control condition (the low control condition was the omitted reference group), and support type (informational support was the omitted reference group) were entered. There was a statistically significant main effect for support type; participants who received emotional support were less satisfied than participants who received informational support ($p = .01$). None of the other effects were statistically significant ($.12 < p's < .34$). The variables in Step 1 predicted 13.1 percent of the variance in support satisfaction.

In Step 2, the interaction between locus of control and types of support and the interaction between locus of control and control condition were added to the model. Neither of the interaction terms significantly predicted support satisfaction ($.32 < p's < .98$). The variables added in Step 2 accounted for an additional 1.4 percent of the variance in support satisfaction.

In Step 3, the three-way interaction between locus of control, control condition, and support type was added to the model. This interaction term did not significantly predict support satisfaction ($p = .33$). The variables added in Step 3 predicted an additional 1.3 percent of the variance in support satisfaction.

Table 10: Locus of control and support predicting support satisfaction

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1					
	Locus of control	0.77	0.18	1.56	.12
	High control condition	-0.17	-0.11	-0.96	.34
	Emotional support	-0.47	-0.31	-2.71	.01
Step 2					
	Locus of control	1.48	1.14	1.30	.20
	High control condition	-0.16	0.56	-0.28	.78
	Emotional support	0.09	0.58	0.15	.88
	Locus x emotional support	-1.07	1.06	-1.01	.32
	Locus x control condition	-0.03	1.04	-0.03	.98
Step 3					
	Locus of control	1.04	0.24	0.85	.40
	High control condition	-0.20	-0.13	-0.36	.72
	Emotional support	-0.03	-0.02	-0.06	.96
	Locus x emotional support	-0.49	-0.19	-0.41	.69
	Locus x high control condition	0.45	0.18	0.39	.70
	Locus x high control x emotional support	-0.66	-0.23	-0.99	.33

Note. $n = 70$. $R^2 = .131$ for Step 1 ($p < .05$); $\Delta R^2 = .014$ for Step 2 ($p = .59$); $\Delta R^2 = .013$ for Step 3 ($p = .33$).

A multiple regression analysis was conducted to predict support satisfaction from perceived control and support condition. These results are shown in Table 11. In Step 1, perceived control (as measured by the control manipulation check), control condition (the low control condition was the omitted reference group), and support type (informational

support was the omitted reference group) were entered into the model. All three main effects were statistically significant. Participants with higher perceived control scores were more satisfied with support than participants with lower perceived control scores, regardless of support type ($p = .01$). Controlling for perceived control, participants in the high control condition were marginally less satisfied with support than participants in the low control condition, regardless of support condition ($p = .06$). Controlling for both perceived control and control condition, participants who received emotional support were less satisfied than participants who received informational support ($p = .01$). The variables in Step 1 accounted for 24 percent of the variance in support satisfaction.

In Step 2, the interaction between perceived control and type of support and the interaction between perceived control and control condition was added to the equation. The two-way interaction between perceived control score and control condition was significant, such that participants who perceived control over giving an impromptu speech and were in the high control condition were more satisfied with support than other participants ($p = .07$). A figure depicting this interaction is included in Appendix F. The interaction between perceived control and support type did not significantly predict support satisfaction ($p = .15$). The variables added in Step 2 predicted an additional 7.8 percent of the variance in support satisfaction.

In Step 3, the three-way interaction between perceived control, control condition, and types of support was added to the equation. The interaction term did not significantly predict support satisfaction ($p = .19$). The variables added in Step 3 accounted for an additional 1.8 percent of the variance in support satisfaction.

Table 11: Perceived control and support predicting support satisfaction

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1					
	Perceived control	0.40	0.40	3.54	.01
	High control condition	-0.32	-0.21	-1.91	.06
	Emotional support	-0.42	-0.27	-2.56	.01
Step 2					
	Perceived control	0.47	0.47	1.64	.11
	High control condition	-1.55	-1.03	-2.26	.03
	Emotional support	0.74	0.48	0.87	.39
	Perceived control x emotional support	-0.40	-0.83	-1.46	.15
	Perceived control x high control	0.42	0.95	1.86	.07
Step 3					
	Perceived control	0.39	0.38	1.31	.19
	High control condition	-1.53	-1.01	-2.24	.03
	Emotional support	0.46	0.30	0.53	.60
	Perceived control x emotional support	-0.23	-0.47	-0.76	.45
	Perceived control x high control	0.49	1.11	2.12	.04
	Perc control x high control x emotional support	-0.14	-0.29	-1.31	.19

Note. $n = 70$. $R^2 = .24$ for Step 1 ($p < .01$); $\Delta R^2 = .078$ for Step 2 ($p = .07$); $\Delta R^2 = .018$ for Step 3 ($p = .19$).

Actress Effects

Although each actress delivered a standard script, there were differences in anxiety and support satisfaction as a function of actress. Table 12 displays the means of anxiety and support satisfaction for each type of support. For both types of support, a one-way ANOVA

was conducted to compare the effectiveness of the actresses. For anxiety, there was a marginally significant effect of actress in the emotional support condition, $F(4, 41) = 2.28$, $p = .08$, but not in the informational support condition, $F(4, 41) = 0.93$, $p = .46$. For support satisfaction, there was no effect for actress in the emotional support condition, $F(4, 41) = 1.43$, $p = .24$, or the informational support condition, $F(4, 27) = 0.2$, $p = .99$.

A post-hoc follow-up test with a Bonferroni adjustment was used to determine which actresses differed from one another. Only Actresses Two and Five differed from one another in terms of anxiety ($p = .09$). Specifically, Actress Two's participants had significantly higher anxiety scores than Actress Five's participants. Perhaps Actress Two felt less comfortable delivering the emotional support script than the other actresses. On the other hand, Actress Two may have delivered the emotional support message in such a smooth, professional manner that her sincerity was not believed, and because participants did not believe her, they did not feel supported by her. Both are possibilities. Appendix E further explores the way the actress affected the results for anxiety.

Table 12: Means and standard deviations for anxiety and support satisfaction by actress and support condition

		Actress 1	Actress 2	Actress 3	Actress 4	Actress 5
Anxiety	Emotional support	3.27 (1.42)	4.65 (0.55)	3.38 (1.41)	2.75 (1.14)	2.40 (1.13)
	Informational support	3.73 (1.09)	3.60 (0.70)	3.00 (0.43)	2.56 (0.83)	3.00 (1.56)
Support satisfaction	Emotional support	3.60 (0.82)	3.50 (0.53)	3.53 (1.22)	3.72 (0.48)	3.53 (0.50)
	Informational support	3.02 (0.82)	2.56 (0.97)	3.11 (0.50)	3.43 (0.43)	3.48 (0.64)

Power

A power analysis was conducted to test whether a lack of statistical power to detect statistical significance was a problem. The analyses were run specifically to examine the power to detect interaction terms between control (however it was measured) and support type, given that the hypotheses predicted interactions. The first analysis was conducted to determine the lowest possible power; the main effects were specified to account for zero variance and the interaction was specified to account for one percent of the variance, following Cohen's (1992) specification that one percent of the variance as a small effect. With a sample size of 120 participants power to detect the interaction as statistically significant (in a two-tailed test with $p < .05$) is 0.19, which is quite low. A second analysis was conducted to determine power if the interaction accounted for nine percent of the variance, reflecting a medium effect according to Cohen (1992). With a sample size of 120 participants power to detect the interaction was 0.93, which is higher than the traditional power benchmark of 0.80. In the six multiple regression analyses that were conducted, the two-way interactions between control and support type account for from 0.7 to 2.3 percent of the variance in the dependent variables. Therefore, it is evident that the effect sizes for the interactions were small, and therefore the sample was not large enough to provide a powerful test of the predicted interactions given the effect size.

Results for More Extreme Groups

Because control condition was not a strong predictor of anxiety, another series of analyses was conducted. These analyses were restricted to participants for whom the control manipulation was most effective. Effectiveness was operationally defined as being in the low control condition and having a perceived control score in the bottom third of the

distribution, versus being in the high control condition and having a perceived control score in the top third of the distribution. The results for this select group of participants can be found in Appendix D.

DISCUSSION

Summary of Results for Anxiety

No evidence was found to support predictions based on the optimal matching model. Although analyses indicated that the control manipulation created two groups who differed significantly in their perceived control over the task of giving an impromptu speech and that the participants correctly recognized the type of support they received, neither the control condition, the support condition, nor their interaction significantly predicted anxiety. At the risk of over-interpreting non-significant results, I will discuss the unexpected pattern of findings, with the goal of identifying leads to pursue in future tests of optimal matching theory predictions.

The trend in the means was opposite to the optimal matching model's predictions. Participants in the low control condition experienced slightly *less* anxiety when they received informational support than when they received emotional support, and participants in the high control condition experienced slightly *less* anxiety when they received emotional support than when they received informational support. Locus of control and perceived control scores both negatively predicted anxiety, such that participants who felt more in control experienced less anxiety. However, the interactions between both locus of control and perceived control and type of support received failed to significantly predict anxiety. Finally, the effects of receiving support that matched both a participant's control condition and locus of control failed to significantly predict anxiety.

While acknowledging the risk of over-interpreting results that were not statistically significant, I will discuss possible reasons for the unexpected pattern of results. First, although the control manipulation created two groups who differed in their sense of control

over giving an impromptu speech, the perceived control score for both groups was near the scale midpoint of three (2.74 for the low control condition, 3.21 for the high control condition). Although the "high" control group had a higher mean perceived control score than the "low" control group, it was only high relative to the low control group, and not in an absolute sense. In essence, the two control conditions could be thought of as the "higher" and "lower" control groups. The weakness of the control manipulation may be responsible for the results not conforming to expectations.

Another, less likely possibility is that the logic behind the original optimal matching model is incorrect. According to the predictions, when people feel in control they should benefit from information and advice, which will presumably allow them to more successfully exert control over the stressor. Receiving warmth and empathy should benefit them little. In this study, it appeared that perhaps warmth and empathy were helpful for people in stressful situations where control was high. People who feel a degree of control over their problem might need the acceptance and encouragement of emotional support in order to effectively exert control over the situation. Without receiving emotional support, they may be left with feelings of self-doubt or trepidation. The pattern of emotional support being helpful in high controllability situations was also found in Swanson-Hyland's (1996) study of diabetes patients and their spouses. She found that diabetics who felt a high degree of control over their illness were most satisfied with their relationship when their spouse provided high levels of emotional support. The detrimental effect of informational support in high controllability situations was unexpectedly found in Cutrona and Suhr's (1992) study of married couples. When individuals' problems were rated high in controllability, the more

informational support they received from their spouse, the less satisfied they were with the support interaction.

On the other hand, the model predicts that when people feel a lack of control they should benefit from warmth and caring, which will presumably help soothe the negative emotions caused by the stressful event. Receiving information and advice should benefit them little, because they cannot fix or change the problem using that advice. Instead, it appears that perhaps information and advice are helpful for people in stressful situations where control is low. People who feel a lack of control over their problem may feel more in control when others act as if they have control by suggesting what to do. Without receiving informational support, they may be left wallowing in feelings of helplessness, whereas information and advice may increase feelings of control, which may help alleviate negative emotions.

Although the pattern of means for anxiety suggested the opposite pattern from the optimal matching model, these results were not statistically significant, so one must be cautious about overestimating the practical importance of the findings. However, the lack of consistent empirical support for the optimal matching model does suggest the possibility that the model, although logically appealing, is not useful for predicting mental health during a stressful life event.

Summary of Results for Support Satisfaction

The results for support satisfaction also did not support the hypotheses. Receiving support that matched a participant's control condition or trait locus of control failed to significantly predict high support satisfaction. Even receiving support that matched both a participant's control condition and locus of control failed to significantly predict high support

satisfaction. However, a few effects that the optimal matching model did not predict were statistically significant.

Overall, participants were more satisfied with informational support than emotional support in both the low and high control conditions. This pattern may not be surprising considering that giving an impromptu speech is an inherently controllable activity. Although we tried to lead our participants to perceive that they lacked control over the task, objectively they really did have control. The optimal matching model predicts that, when a stressor is controllable, participants should feel more satisfied with informational support, and in this study they did.

The results for support satisfaction failed to correspond with most of the previous research done on social support and optimal matching. Researchers have previously found that emotional support is preferred no matter the controllability of the situation (Cutrona & Suhr, 1992), and is even considered an adequate replacement for informational support (Cutrona, Cohen, & Igram, 1990). Typically, participants in optimal matching research have been less satisfied with informational support than emotional support (Cutrona & Suhr, 1992; Swanson-Hyland, 1996). In this study, informational support was preferred no matter the level of controllability of the situation.

Overall, the results for support satisfaction mirror much of the research in the coping goodness-of-fit literature. Many of these studies (Masel, Terry & Gribble, 1996; Conway & Terry, 1992; Osowiecki & Compas, 1999; Vitaliano et al., 1990) have found that emotion-focused coping is not adaptive for either controllable or uncontrollable stressors. In this study, participants were slightly less satisfied when they received emotional support than when they received informational support, in both the high and low control conditions.

However, the goodness-of-fit literature typically assesses a mental health outcome rather than support satisfaction.

The connections between this study and the coping goodness-of-fit literature are intriguing. Some might say that social support provided via videotape is too different from the real thing, and that the support interactions should be conceptualized as coping tools. Specifically, the support analog might really be a coping aid consisting of brief suggestions from a stranger to use either problem-focused or emotion-focused coping. This study might mirror the coping literature because it is, in essence, a coping study.

As for the significant results the optimal matching model did not predict, controlling for perceived control (as measured by the control manipulation check), participants in the high control condition were significantly less satisfied with the support they received than participants in the low control condition, regardless of support type. However, participants who were high in perceived control and in the high control condition were more satisfied with support than other participants.

The way these results should be interpreted is questionable. It may be the case that attributions play a role. Specifically, feeling in control over one's performance on the impromptu speech task only allows participants to attribute failure on the task to themselves. Such thoughts may have lead some participants in the high control condition to feel less satisfied with the support they received, because their control led them to "need" higher quality support in order to perform the task successfully. However, these results are probably too complex to be entirely explained by attributions.

Another interesting pattern of findings from this study deserves consideration. There may be a difference between the type of support from which participants benefit and the type

of support participants prefer. Overall, participants who received informational support were more satisfied with it, saying it was more effective, beneficial, and of higher quality than emotional support. However, in the high control condition participants who received emotional support had lower levels of anxiety than participants who received informational support. Although the participants reacted more favorably toward the informational support, they felt better when they received emotional support. It may be that the optimal matching model needs to acknowledge that support satisfaction is different from psychological benefit, and the same type of support can affect these two outcomes differently.

Limitations

As previously discussed, the sample size was not large enough to detect effect sizes as small as those in this study. With more participants, some of the effects that were not significant probably would have attained significance. However, after examining some unexpected patterns in the data, we felt it was not worthwhile to continue with the study. Although we asked our participants not to tell other prospective participants about the study, it appears that as time went on, more and more participants knew that no speech was actually required. Over the course of the study, anxiety decreased; anxiety scores were negatively correlated with how late in the semester a participant participated in experiment ($r = -.23$, $p < .05$). The perceived control manipulation also weakened across the semester. In the first third of participants, the Cohen's d for the effect size reflecting the difference in perceived control between the high and low control groups was .75. For the second third of the participants, the Cohen's d was .77. For the final third of the participants, the Cohen's d was .29. If participants knew from people who had already completed the study that they would not have to actually give a speech, their anxiety level would be expected to be much lower.

Thus, the experimental manipulations would have little effect. It appears that the research participation pool was contaminated in terms of prospective participants knowing about the study before they arrived, so the decision was made not to increase the sample size by running more participants.

It is possible that participants in the emotional support condition did not interpret the emotional support as intended. Participants in the emotional support condition were told that Iowa State University students tend to do well on the impromptu speech, and that they will do well, too. It is possible that this statement increased participants' anxiety because they felt like, if they performed badly, they would be the only person in the experiment who did not do well. It is also possible that the control manipulation did not work as intended. Specifically, in the low control group, we tried to alter participant's perceptions of how much control they had over giving an impromptu speech. In reality, all participants had quite a bit of control over giving an impromptu speech, which as an inherently controllable activity. Participants in the low control condition may not have truly believed that they had little control over giving an impromptu speech.

Caution should be used in generalizing the results of this study. Due to ethical concerns, we were required by the Iowa State University institutional review board to warn prospective participants that the study might involve some discomfort when we recruited them for participation. Undoubtedly, some prospective participants were intimidated by this warning and declined to participate, whereas others were intrigued by the warning and agreed to participate out of curiosity. Still others were unaffected by the warning and agreed or declined to participate based on other reasons. We cannot know how the personality variables of prospective participants who declined to participate would have affected the

results. Therefore, the results of this study should only be generalized to people who would not have been intimidated by a warning about discomfort.

Finally, it must be noted that this study may have lacked external validity. First, the stressor participants endured in this study was emotionally intense but relatively minor and brief. Real stressors people deal with last much longer and are often severe enough to affect many facets of their lives. Second, videotaped support messages in this study are only analogs to social support that occurs in the real world. Social support is typically provided by a friend or loved one; in this study, a stranger provided support. Social support is typically provided during an interactive conversation. Not only were our support conversations one-sided, but the actresses appeared via videotape rather than in person. Finally, our support conversations were rather brief (less than two minutes long), whereas support in the real world is often an on-going activity that lasts months or years. It may be that this experiment's lack of external validity makes it an unrealistic test of the optimal matching model.

Future Research Directions

Future research should strive for more external validity. The Horowitz and colleagues (2001) study was probably the closest in terms of testing the optimal matching model experimentally but also retaining external validity. Horowitz asked participants to discuss a relationship-related or achievement-related problem and then receive support that either matched or did not match the problem. Participants who received support that matched their problem type had less negative affect and were more satisfied than participants whose support did not match their problem. However, Horowitz did not measure the controllability of the situations participants discussed; instead, they asked participants to discuss a particular

type of problem. To test the optimal matching model, the controllability of the problems participants discussed be measured. Also, Horowitz had strangers provide support to participants. Recruiting friends of participants to provide support would be a better condition. As natural members of the participants' social networks, the comfort friends provide would be much closer to "support" than anything a stranger could say. Also, emotional support, which is more personal and intimate than other types of support, can be awkward and unnatural for a stranger. By contrast, a friend would intuitively know how to provide such support. Research that focuses on real life events and provides support that is as genuine as possible will provide the most valid test of the optimal matching model.

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APPENDIX A**ROTTER'S INTERNAL-EXTERNAL LOCUS OF CONTROL MEASURE**

For items 1-24, please choose the statement you agree with more and place a check mark or an x on the blank directly before that statement. Please choose only ONE statement per item, and feel free to skip any questions you would rather not answer.

1. _____ Many of the unhappy things in people's lives are partly due to bad luck.
_____ People's misfortunes result from the mistakes they make.
2. _____ One of the major reasons why we have wars is because people don't take enough interest in politics.
_____ There will always be wars, no matter how hard people try to prevent them.
3. _____ In the long run, people get the respect they deserve in this world.
_____ Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
4. _____ The idea that teachers are unfair to students is nonsense.
_____ Most students don't realize the extent to which their grades are influenced by accidental happenings.
5. _____ Without the right breaks, one cannot be an effective leader.
_____ Capable people who fail to become leaders have not taken advantage of their opportunities.
6. _____ No matter how hard you try, some people just don't like you.
_____ People who can't get others to like them don't understand how to get along with others.
7. _____ I have often found that what is going to happen will happen.
_____ Trusting fate has never turned out as well for me as making a decision to take a definite course of action.

8. _____ In the case of the well prepared student, there is rarely, if ever, such a thing as an unfair test.

_____ Many times exam questions tend to be so unrelated to course work that studying is really useless.

9. _____ Becoming a success is a matter of hard work; luck has little or nothing to do with it.

_____ Getting a good job depends mainly on being in the right place at the right time.

10. _____ The average citizen can have an influence in government decisions.

_____ This world is run by the few people in power, and there is not much the little guy can do about it.

11. _____ When I make plans, I am almost certain that I can make them work.

_____ It is not always wise to plan too far ahead because many things turn out to be a matter of luck anyway.

12. _____ In my case, getting what I want has little to do with luck.

_____ Many times we might just as well decide what to do by flipping a coin.

13. _____ What happens to me is my own doing.

_____ Sometimes I feel that I don't have enough control over the direction my life is taking.

14. _____ With enough effort we can wipe out political corruption.

_____ It is difficult to have much control over the things politicians do in office.

15. _____ Who gets to be the boss often depends on who was lucky enough to be in the right place first.

_____ Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

16. _____ As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.

_____ By taking an active part in political and social affairs people can control world events.

17. ____ Most people don't realize the extent to which their lives are controlled by accidental happenings.

____ There is really no such thing as "luck".

18. ____ It is hard to know whether or not a person really likes you.

____ How many friends you have depends upon how nice a person you are.

19. ____ In the long run the bad things that happen to us are balanced by the good things.

____ Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

20. ____ With enough effort we can wipe out political corruption.

____ It is difficult for people to have much control over the things politicians do in office.

21. ____ Sometimes I can't understand how teachers arrive at the grades they give.

____ There is a direct connection between the how hard I study and the grades I get.

22. ____ Many times I feel that I have little influence over the things that happen to me.

____ It is impossible for me to believe that chance or luck plays an important role in my life.

23. ____ People are lonely because they don't try to be friendly.

____ There's not much use in trying too hard to please people, if they like you, they like you.

24. ____ Most of the time I can't understand why politicians behave the way they do.

____ In the long run the people are responsible for bad government on a national as well as on a local level.

APPENDIX B

WATSON'S POSTIVE-NEGATIVE AFFECT SCHEDULE

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely
_____	_____	_____	_____	_____
interested			irritable	
_____	_____	_____	_____	_____
distressed			alert	
_____	_____	_____	_____	_____
excited			ashamed	
_____	_____	_____	_____	_____
upset			inspired	
_____	_____	_____	_____	_____
strong			nervous	
_____	_____	_____	_____	_____
guilty			determined	
_____	_____	_____	_____	_____
scared			attentive	
_____	_____	_____	_____	_____
hostile			jittery	
_____	_____	_____	_____	_____
enthusiastic			active	
_____	_____	_____	_____	_____
proud			afraid	

APPENDIX C**SUPPORT EVALUATION FORM**

Please use the following scale to answer items 1 a-c and 2 a-c:

1-Very often 2-Often 3-A few times 4-Rarely 5-Never

1. On the videotape, how often did the supporter provide the following types of help or support?

- _____ a. Offered information, advice, or suggestions about public speaking
- _____ b. Expressed caring, concern, sympathy, or understanding
- _____ c. Expressed belief in my competence or ability to give a good speech

2. Given that you were placed in a situation where you had to give an impromptu speech, how often would you like to receive the following types of help or support?

- _____ a. Offer information, advice, or suggestions about public speaking
- _____ b. Express caring, concern, sympathy, or understanding
- _____ c. Express belief in my competence or ability to give a good speech

Please rate the supportive message from the videotape by indicating the extent to which you agree or disagree with the following statements. Feel free to skip any items you would rather not answer. Use the following scale to make your ratings:

1-Strongly agree 2-Agree 3-Neutral 4-Disagree 5-Strongly disagree

- _____ 3. The supporter gave me no useful information.
- _____ 4. I felt as if the supporter really cared about me.
- _____ 5. After watching the tape, I felt worse about myself.
- _____ 6. The supporter acted warmly.
- _____ 7. The supporter made me feel comfortable about myself and my feelings.
- _____ 8. The supporter offered me good, practical advice.
- _____ 9. The supporter was sensitive to my feelings.
- _____ 10. The supporter did not take my situation seriously.
- _____ 11. The supporter made me feel that I had the skills to handle the situation.
- _____ 12. The supporter was overbearing and bossy.
- _____ 13. The supporter was indifferent to my needs.
- _____ 14. The supporter showed respect for my capabilities and talents.
- _____ 15. I feel less anxious about giving an impromptu speech after watching the videotape.
- _____ 16. I am NOT satisfied with the support received from the tape.
- _____ 17. I think the supporter provided high quality support.
- _____ 18. I benefited from watching the videotape.
- _____ 19. I feel more prepared to give an impromptu speech after watching the videotape.

APPENDIX D

ANALYSES FOR A SUBGROUP OF PARTICIPANTS

Anxiety in a Subsample

According to the optimal matching model, in the low control condition, anxiety should be lowest for the participants who receive emotional support. In Table 13, it is evident that anxiety is actually lowest for participants who received informational support, and very similar for participants who received either no support or emotional support. In terms of Cohen's d , the difference between emotional support and informational support in the low control condition is moderate ($d = .53$). In the high control condition, anxiety is hypothesized to be lowest for participants who receive informational support. It is evident that anxiety is actually highest for participants who received informational support, and very similar for participants who received either no support or emotional support. In terms of Cohen's d , the difference between emotional support and informational support in the high control condition is small to moderate ($d = -.34$).

Table 13: Means and standard deviations for anxiety in a subsample by control and support conditions

	No support			Emotional support			Informational support		
	m	sd	n	m	sd	n	m	sd	n
Low control	3.67	1.21	16	3.63	1.23	15	3.00	1.14	5
High control	3.09	1.29	17	3.02	1.69	14	3.50	1.07	6

In Table 14, a multiple regression analysis was conducted to predict anxiety from control condition and support condition. In step 1, control condition (the low control condition was the reference group) and support type (for both codes, no support condition

was the reference group) were entered into the model. Neither of the main effects was significant ($.18 < p$'s $.89$). The variables in Step 1 accounted for 2.5 percent of the variance in anxiety.

In step 2, the interaction between control condition and type of support were added to the model. Neither of the interaction terms significantly predicted anxiety ($.22 < p$'s $.96$). The variables added in Step 2 predicted 2.6 percent of the variance in anxiety.

Table 14: Control and support predicting anxiety for subsample

	<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1				
High control condition	-0.41	-0.16	-1.34	.18
Emotional support	-0.04	-0.02	-0.14	.89
Informational support	-0.09	-0.03	-0.21	.83
Step 2				
High control condition	0.58	-0.22	-1.27	.21
Emotional support	-0.04	-0.01	-0.08	.94
Informational support	-0.67	-0.20	-1.06	.29
High control x emotional support	-0.03	-0.01	-0.05	.96
High control x informational support	1.08	0.24	1.25	.22

Note. $n = 73$. $R^2 = .025$ for Step 1 ($p = .61$) ; $\Delta R^2 = .026$ for Step 2 ($p = .40$).

Next, a multiple regression analysis was conducted to predict anxiety from locus of control and support condition. These results are shown in Table 15. In Step 1, the direct effects for locus of control (with higher scores indicating a more internal locus of control), control condition (the low control condition was the omitted reference group), and support

type (for both codes, the no support condition was the omitted reference group) were entered into the model. There was a statistically significant main effect for locus of control.

Participants with a more internal locus of control felt less anxious than participants with a more external locus of control. None of the other main effects were statistically significant ($.30 < p's < .89$). The variables in Step 1 accounted for 9.7 percent of the variance in anxiety.

In Step 2, the interaction between locus of control and both types of support and the interaction between locus of control and control condition was added to the model. Locus of control was a significant predictor of anxiety ($p = .02$). Participants with a more internal locus of control reported lower anxiety than participants with a more external locus of control. None of the interaction terms significantly predicted anxiety ($.11 < p's < .63$). Overall, the variables added in Step 3 predicted 3.7 percent of the variance in anxiety.

In Step 3, the three-way interaction between locus of control, control condition, and types of support was added to the model. Neither of the terms for the three-way interaction were significant ($.20 < p's < .84$). The variables added in Step 3 predicted 2.2 percent of the variance in anxiety.

Table 15: Locus of control and support predicting anxiety

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1					
	Locus of control	-2.30	-0.28	-2.36	.02
	High control condition	-0.31	-0.12	-1.04	.30
	Emotional support	-0.04	-0.16	-0.13	.89
	Informational support	-0.29	-0.08	-0.67	.50
Step 2					
	Locus of control	-3.93	-0.47	-2.33	.02
	High control condition	0.15	0.06	0.14	.89
	Emotional support	-1.86	-0.70	-1.59	.12
	Informational support	-2.01	-0.59	-1.10	.28
	Locus x high control condition	3.36	0.74	1.63	.11
	Locus x emotional support	3.35	0.46	0.90	.37
	Locus x informational support	-0.95	-0.22	-0.48	.63
Step 3					
	Locus of control	-4.00	-0.48	-2.34	.02
	High control condition	-0.20	-0.08	-0.18	.86
	Emotional support	-1.91	-0.71	-1.62	.11
	Informational support	-2.07	-0.60	-1.13	.27
	Locus x high control condition	3.31	0.73	1.50	.14
	Locus x emotional support	2.29	0.32	0.60	.55
	Locus x informational support	-0.73	-0.16	-0.34	.73
	Locus x high control x emotional support	0.23	0.04	0.20	.84
	Locus x high control x informational support	2.24	0.24	1.29	.20

Note. $n = 73$. $R^2 = .097$ for Step 1 ($p = .12$); $\Delta R^2 = .037$ for Step 2 ($p = .42$); $\Delta R^2 = .022$ for Step 3 ($p = .44$).

A multiple regression analysis was conducted to predict anxiety from perceived control (as measured by the control manipulation check) and support condition. These results are shown in Table 16. In Step 1, the direct effects for perceived control score, control condition (the low control condition was the omitted reference group, and support type (for both codes, the no support condition was the omitted reference group) were entered into the model. There was a statistically significant main effect for perceived control score. Participants with higher perceived control scores were less anxious than participants with lower perceived control scores ($p < .01$). There was also a marginally significant main effect for control condition. Controlling for perceived control, participants in the high control condition were more anxious than participants in the low control condition ($p = .10$). No other main effects were statistically significant ($.65 < p's < .93$). The variables in Step 1 explained 51.6 percent of the variance in anxiety.

In Step 2, the interaction terms between the perceived control score and types of support and the interaction between perceived control score and control condition were added to the model. None of the interaction terms significantly predicted anxiety ($.30 < p's < .63$). The variables added in Step 2 predicted 3.4 percent of the variance in anxiety.

In Step 3, the three-way interaction between perceived control score, control condition, and the types of support was added to the model. Neither of the interaction terms significantly predicted anxiety ($.37 < p's < .42$). The variables added in Step 3 predicted .8 percent of the variance in anxiety.

Table 16: Perceived control and support predicting anxiety

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1					
	Perceived control	-1.02	-0.77	-8.42	.01
	High control condition	0.39	0.15	1.66	.10
	Emotional support	-0.11	-0.04	-0.46	.65
	Informational support	-0.02	-0.10	-0.10	.93
Step 2					
	Perceived control	-1.30	-0.97	-5.72	.01
	High control condition	-0.37	-0.14	-0.48	.63
	Emotional support	-0.48	-0.18	-0.65	.52
	Informational support	-2.14	-0.62	-1.64	.11
	Perceived control x emotional support	0.11	0.14	0.49	.63
	Perceived control x informational support	0.69	0.64	1.68	.10
	Perceived control x high control condition	0.26	0.37	1.05	.30
Step 3					
	Perceived control	-1.21	-0.90	-4.91	.01
	High control condition	-0.40	-0.15	-0.51	.61
	Emotional support	-0.21	-0.08	-0.26	.80
	Informational support	-1.84	-0.53	-1.36	.18
	Perceived control x emotional support	-0.06	-0.07	-0.18	.86
	Perceived control x informational support	0.49	0.45	1.04	.30
	Perceived control x high control condition	0.19	0.26	0.71	.48
	Perc control x high control x emotional support	0.14	0.16	0.81	.42
	Perc control x high control x informational support	0.19	0.14	0.91	.37

Note. $n = 73$. $R^2 = .516$ for Step 1 ($p < .01$); $\Delta R^2 = .034$ for Step 2 ($p = .28$); $\Delta R^2 = .008$ for Step 3 ($p = .58$).

Summary of Results for Anxiety

Rerunning the analyses on the select group of participants for whom the control manipulation worked did not help the results conform to the hypotheses. In their respective analyses, the interactions between control condition and support type and locus of control and support type were still not significant. The three-way interaction between control condition, locus of control, and support type also failed to attain significance. Restricting the analyses did enhance the pattern seen in the entire sample, that in the high control condition, participants were less anxious when they received emotional support than when they received informational support, and that in the low control condition, participants were less anxious when they received informational support than when they received emotional support.

Support Satisfaction in the Subsample

For the subsample of participants for whom the control manipulation really worked, in both the low control and high control groups, participants preferred informational support to emotional support. The optimal matching model predicts that informational support should be preferred in the high control condition, but emotional support should be preferred in the low control condition. The preference for informational support is stronger in the high control condition (Cohen's $d = .82$) than in the low control condition (Cohen's $d = .58$).

Table 17: Means and standard deviations for support satisfaction in the subsample by control and support condition

	Emotional support			Informational support		
	m	sd	n	m	sd	n
Low control	3.25	0.73	15	3.60	0.42	5
High control	2.91	0.96	14	3.69	0.94	6

In Table 18, a multiple regression analysis was conducted to predict support satisfaction from control condition and support condition. In Step 1, control condition (the low control condition was the omitted reference group) and support type (informational support was the omitted reference group) were entered into the equation. There was a statistically significant main effect for support type. Participants who received emotional support were less satisfied than participants who received informational support ($p = .06$). The main effect for control condition was not significant ($p = .32$). The variables in Step 1 accounted for 10.4 percent of the variance in support satisfaction.

In Step 2, the interaction between control condition and support condition was added to the model. The interaction did not significantly predict support satisfaction ($p = .40$). The variable added in Step 2 accounted for 1.7 percent of the variance in support satisfaction.

Table 18: Control condition and support predicting support satisfaction for the subsample

	<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1				
High control condition	-0.26	-0.16	-1.02	.32
Emotional support	-0.55	-0.30	-1.95	.06
Step 2				
High control condition	0.01	0.05	0.18	.86
Emotional support	-0.29	-0.16	-0.68	.50
High control x emotional support	-0.49	-0.27	-0.86	.40

Note. $n = 40$. $R^2 = .104$ for Step 1 ($p = .12$); $\Delta R^2 = .017$ for Step 2 ($p = .40$).

A multiple regression analysis was conducted to predict support satisfaction from locus of control and support condition. These results are shown in Table 19. In Step 1, the

direct effects for locus of control (with higher scores indicating a more internal locus of control), control condition (the low control condition was the omitted reference group), and support type (informational support was the omitted reference group) were entered into the model. The main effects for locus of control and type of support were statistically significant. Participants with a more internal locus of control were more satisfied with support than participants with a more external locus of control ($p = .05$), regardless of support type. Controlling for locus of control and control condition, participants who received emotional support were less satisfied ($p = .02$) than participants who received informational support. The main effect for control condition was not statistically significant ($p = .15$). The variables in Step 1 explained 19.7 percent of the variance in support satisfaction.

In Step 2, the interaction between locus of control and type of support and the interaction between locus of control and control condition was added to the model. Neither of the interaction significantly predicted support satisfaction ($.40 < p$'s $.85$). The variables added in Step 2 predicted 1.9 percent of the variance in support satisfaction.

In Step 3, the three-way interaction between locus of control, control condition, and support type was added to the model. The three-way interaction was marginally significant ($p = .07$), such that participants who had a more internal locus of control, were in the high control condition, and received emotional support were less satisfied with the support than other participants. The variable added in Step 3 predicted 7.3 percent of the variance in support satisfaction.

Table 19: Locus of control and support predicting support satisfaction for the subsample

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1					
	Locus of control	1.64	0.32	2.08	.05
	High control condition	-0.37	-0.22	-1.46	.15
	Emotional support	-0.68	-0.37	-2.43	.02
Step 2					
	Locus of control	1.39	0.27	0.52	.61
	High control condition	-1.10	-0.66	-1.20	.24
	Emotional support	-0.50	-0.27	-0.38	.71
	Locus x emotional support	-0.49	-0.17	-0.19	.85
	Locus x high control condition	1.40	0.50	0.86	.40
Step 3					
	Locus of control	0.48	0.92	0.18	.86
	High control condition	-1.60	-0.96	-1.73	.09
	Emotional support	-0.49	-0.27	-0.38	.70
	Locus x emotional support	0.51	0.18	0.20	.85
	Locus x high control condition	3.86	1.38	1.87	.07
	Locus x high control x emotional support	-2.09	-0.74	-1.87	.07

Note. $n = 40$. $R^2 = .197$ for Step 1 ($p < .05$); $\Delta R^2 = .019$ for Step 2 ($p = .66$); $\Delta R^2 = .073$ ($p = .07$) for Step 3.

A multiple regression analysis was conducted to predict support satisfaction from perceived control and support condition. These results are shown in Table 20. In Step 1, the direct effects for perceived control, control condition (the low control condition was the omitted reference group), and support condition (informational support was the omitted reference group) were entered into the equation. All main effects were statistically significant. Participants with higher perceived control scores were more satisfied with support than participants with lower perceived control scores ($p = .02$). Controlling for perceived control, participants in the high control condition were less satisfied with support than participants in the low control condition ($p = .02$). Controlling for both perceived control score and control condition, participants who received emotional support were marginally less satisfied than participants who received informational support ($p = .09$). The variables in Step 1 accounted for 31.1 percent of the variance in support satisfaction.

In Step 2, the interaction terms between perceived control and type of support and perceived control and control condition were added to the model. Only the two-way interaction between perceived control score and control condition was marginally significant, such that participants who perceived control over giving an impromptu speech and were in the high control condition were more satisfied with support than other participants ($p = .09$). The interaction between perceived control and type of support was not significant ($p = .50$). The variables added in Step 2 accounted for 6.3 percent of the variance in support satisfaction.

In Step 3, the three-way interaction between perceived control, control condition, and type of support was added to the model. The three-way interaction did not significantly

predict support satisfaction. The variable added in Step 3 accounted for 3.5 percent of the variance in support satisfaction.

Table 20: Perceived control and support condition predicting support satisfaction for the subsample

		<i>B</i>	β	<i>t</i>	<i>p</i>
Step 1					
	Perceived control	0.44	0.50	3.34	.02
	High control condition	-0.59	-0.35	-2.36	.02
	Emotional support	-0.45	-0.25	-1.77	.09
Step 2					
	Perceived control	0.34	0.39	0.96	.34
	High control condition	-1.92	-1.15	-2.35	.02
	Emotional support	0.17	0.09	0.16	.88
	Perceived control x emotional support	-0.23	-0.43	-0.68	.50
	Perceived control x high control	0.47	1.01	1.74	.09
Step 3					
	Perceived control	0.23	0.26	0.64	.53
	High control condition	-1.83	-1.09	-2.27	.30
	Emotional support	-0.14	-0.08	-0.13	.90
	Perceived control x emotional support	0.01	0.02	0.03	.97
	Perceived control x high control	0.58	1.26	2.10	.04
	Perc control x high control x emotional support	-0.24	-0.48	-1.43	.16

Note. $n = 40$. $R^2 = .311$ for Step 1 ($p < .01$); $\Delta R^2 = .063$ for Step 2 ($p = .19$); $\Delta R^2 = .035$ for Step 3 ($p = .16$).

Summary of Results for Support Satisfaction

Running analyses for support satisfaction on only participants for whom the control manipulation resulted in support for one hypothesis. The control condition by support type and locus of control by support type interactions remained nonsignificant. However, the three-way interaction of locus of control, control, and emotional support was marginally significant ($p < .04$). Participants in the high control condition who had an internal locus of control and received emotional support had reduced support satisfaction, a pattern optimal matching would predict.

APPENDIX E

ACTRESS EFFECTS AND ANXIETY

To investigate how the actress effects influenced the results for anxiety, a univariate analysis of variance test was conducted (multicollinearity problems prevented the statistical software package from running this test as a regression with dummy codes). The main effects for control condition and support type, and the interaction between the two, were tested with actress as a covariate. The main effects and interaction were not statistically significant. The actress effect did not change the results of the study.

	SS	df	MS	F	Sig.
Intercept	326.15	1	326.15	223.71	.00
Actress	7.12	1	7.12	4.88	.03
Control	0.34	1	0.34	0.23	.63
Support	0.15	1	0.15	0.10	.75
Control x support	0.94	1	0.94	0.64	.43
Error	94.76	65	94.76		
Total	888.44	70	888.44		

APPENDIX F

PLOT OF SIGNIFICANT INTERACTION

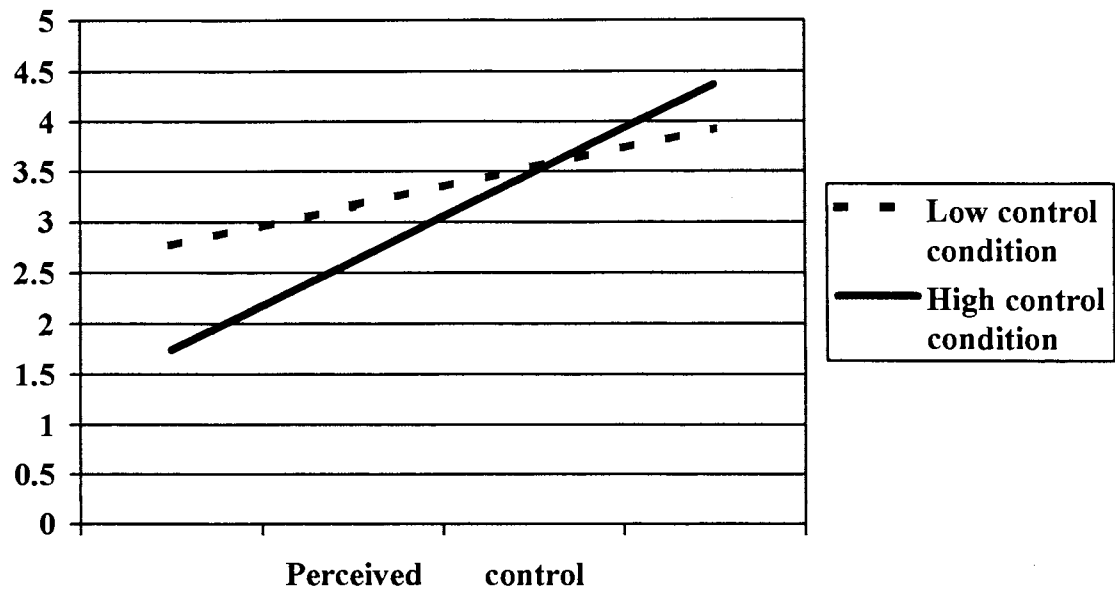


Figure 1: Interaction between level of perceived control and control condition in predicting support satisfaction.