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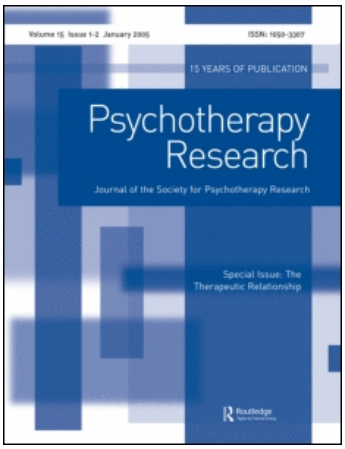

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The effect of choice between test anxiety treatment options on treatment outcomes

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The effect of choice between test anxiety treatment options on treatment outcomes

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Abstract
Evidence regarding the effect of clients' choice of treatment on treatment outcome is inconsistent. This possible effect was examined by presenting participants with two treatments of test anxiety: advanced muscle relaxation and changing of internal dialogue. Clients ($N=73$) were allocated to three groups: choice (participants chose their preferred treatment), no choice (participants were assigned to their preferred treatment but were led to believe they couldn't choose the treatment they were assigned to), and wait-list control (participants received no treatment until the end of the study). There was a significant linear pattern, with the choice group performing better than the no-choice group with no feeling of control, which in turn performed better than the control group. Limitations and suggestions for future research are discussed.

Keywords: choice; preference; treatment outcome; test anxiety; control; matching

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Psychological treatment, like medical treatment, was based for many years on the opinions of a specialist of renown, who would choose the best and most suitable treatment for the patient (Robert-Tissot & Cramer, 1998). The medical field is currently undergoing a change in approach, motivated by professionals but also by patients, who opt for a more active role in the therapeutic process (Auerbach, 2001). In psychotherapy the change has been much slower despite the fact that today some patients have more information and greater awareness about different options for treatment. Additionally, research gives due credit to the need for matching patients to the right treatment (Beutler & Clarkin, 1990). However, this matching is mostly done without the patients' active participation.

Following general trends in consumer behavior, people want to know more about the "product" they intend to acquire. Therefore, offering patients a choice is an integral part of that trend, wherein psychological treatment is a consumer product and patients should have the right of choice between options. Furthermore, there is a strong belief among clinicians that patients' preferences for a certain therapy could affect its outcome (Bakker, Spinhoven, van Balkom, Vleugel, & van Dyck, 2000). The aim of this study is to explore the effect of offering patients the choice between different treatments and the possible causes of this effect.

A review of literature on the issue of choice between psychological treatments does not provide us with a clear-cut notion about the influence of choice on the effectiveness of treatment. On the one hand, some studies show that patients given the option to choose treatment according to their preferences benefit more from the treatment than those who were not offered the option and those who did not voice their preference for a specific treatment (Devine & Fernald, 1973; Gordon, 1976; Liem, 1975; Mendonca & Brehm, 1983; Rokke & al'Absi, 1992; Rokke, al'Absi, Lall, & Oswald, 1991; Rokke & Lall, 1992). These findings were also observed in studies in which patients were assigned to a different group than the one they preferred or would have chosen (Devine & Fernald, 1973; Kanfer & Grimm, 1978; Renjilian et al., 2001; Rokke & al'Absi, 1992). On the other hand, further studies did not show between-group differences among participants who opted for a choice or stated their preference for specific treatment and those who were assigned to therapy groups randomly or contrary to their choice (Bakker et al., 2000; Chilvers et al., 2001; Duckro &

This research was conducted as a part of Jonathan E. Handelzalts's doctoral dissertation under the supervision of Giora Keinan.
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George, 1979; Murray, 1976; Pilkonis, Imber, Lewis, & Rubinsky, 1974; Rokke, Tomhave, & Jocic, 1999; van Dyck & Spinhoven, 1997).

A review shows that some of these studies suffer from methodological flaws regarding manipulation and theoretical understanding of the treatment choice variable. Some studies did not present participants with real choice, because they did not present the whole spectrum of options or the treatment options were essentially different presentations of the same treatment.

Other studies used different constraints that influenced the assignment of participants to therapy groups, such as a refusal to participate in drug treatment or refusal of random allocation, as a manipulation of a choice option. Finally, almost none of the studies attempted to test hypotheses about why choice might be effective. Several hypotheses were suggested as to the possible influence of the choice variable, but almost none of them were empirically tested. The present study was conducted to fill this gap in the understanding of the effect of choice of treatment.

A review of studies and an attempt to analyze the process of choice provide us with three possible explanations for the effectiveness of treatment choice option: control, matching, and cognitive dissonance.

One explanation is that choice gives the participant a measure of control (Brehm & Smith, 1986). The implied assumption is that choice option creates a feeling of decisional control (Krantz, Baum, & Wideman, 1980). An accepted hypothesis is that enhancing feelings of decisional control, like the notion of control in general, leads to better results in different researched tasks (Brehm & Smith, 1986). The positive influence of control over performance was demonstrated in several studies, and enhancement of control seems to lead to an elevated sense of well-being, satisfaction, psychological adjustment, and other measures of functioning (Burger, 1989; Wallhagen, 1998).

Although there is evidence that control in general, and decisional control through exercising a choice option, may lead to better results in many cases, the relation between the two concepts is still unclear (Brehm & Smith, 1986). Various studies show that the option of control is not a positive factor in all cases (e.g., Miller, 1980). This inconsistency in the findings seems to be related to the fact that the control variable is defined and operated differently in different studies (Wallhagen, 1998). Most of the studies in this field assessed the notion of control in general. The choice of therapy is a particular case that highlights only one sort of control: decisional control.

When therapeutic strategy is being planned, it is advisable to check the patients' status and personality traits before offering them the choice of treatment option. When patients feel that they have failed, despite using the option they chose for themselves, their self-esteem may suffer significantly and they may experience an even greater sense of failure (Brehm & Smith, 1986).

Beyond the different effects of control in various external circumstances, there is significance in the fact that people may react to an option of control in different ways. Control options unsuitable to the level of control expected may cause maladjustment in many cases and thus may not be preferred. A personality variable that may be relevant to the influence of the participants' option to control is the desire for control (Burger & Cooper, 1979). Desire for control, unlike locus of control, is the way people are motivated to perceive themselves as being in control over the various occurrences in their lives. The variable spectrum spans from low desire of control to strong desire for control (Burger & Cooper, 1979). The desire for control may be tied to the influence of therapy choice as a way of decisional control. It seems reasonable that participants with a strong desire for control will benefit from choice option, which will result in control, more than those with low desire for control.

Just as participants can differ in their desire of control, they may also vary in the way they assess and process information about control. Those with a strong desire for control are motivated to see themselves in control in most circumstances and develop cognitive schemes and strategies to relate to, store, and retrieve information about control. They respond better to information about control than participants with a low desire for control (Burger, 1993). It may be deduced that individuals with a strong desire of control will be attentive to the control factor in the choice and, therefore, will benefit more than those with a low desire of control.

Another possible explanation why preferred option choice ameliorates psychological treatment effect is that choice option enhances treatment–patient matching. It is reasonable to assume that when patients perceive a specific treatment as suitable and opt for it, treatment–patient matching is enhanced. It is likely that patients know intuitively or consciously which treatment suits them best and, by stating their preference, can be matched to the treatment that would suit them best (Devine & Fernald, 1973; Robert-Tissot & Cramer, 1998; Rokke & al'Absi, 1992; Rokke et al., 1999).

Although many studies on the matching of therapist, patient, and treatment did not find valuable data regarding the significant relations between the

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various aspects (Omer & Dar, 1992), this is not the complete picture. One of the objections against those studies is that they are based mainly on attempts to match treatment to a specific diagnosis, and there is no reason to assume that a specific psychological treatment will provoke the same reaction in all patients with the same diagnosis. This is contrary to the medical way of thinking, in which a differential diagnosis leads clearly to the treatment. Moreover, most field studies of matching compared variables without a theoretical basis to assume that there should be any interaction between them (Beutler & Harwood, 2000). The study of match model among therapist, patient, and treatment should be more complex (Beutler & Clarkin, 1990) and be based on differentiation between various treatments that vary in theoretical approach and intricate manipulation of the definition of types of participants (Beutler & Harwood, 2000).

As stated earlier, the influence of various choice options on treatment outcome may be explained by elevating the treatment–patient matching. This may be done in two ways. The first is the personal match: Patients have the option to choose the kind of treatment for themselves. The basic assumption is that patients know what treatment suits them best. Patients are assumed to be aware of their own skills and abilities and know better than the therapist which treatment option suits them the best (Rokke & al'Absi, 1992). In the second method of matching, the researchers/therapists match treatment to the patients based on questionnaires or clinical judgment. The assumption in this matching method is that by using their professional tools, the researchers/therapists can match patients to the therapy that suits them best. In the present study, patients were matched according to their preference.

The third feasible explanation regarding the effect of choice option is that when patients are given a choice between different therapies, they are forced to take responsibility for the consequences of that choice (Devine & Fernald, 1973; Gordon, 1976; Mendonca & Brehm, 1983; Rokke & Lall, 1992; Rokke et al., 1999). Therefore, giving a choice option creates a cognitive dissonance (Festinger, 1957), which can result in a shift in patients' preference for the given treatment (Goates-Jones & Hill, 2008). Patients are motivated to justify their stated preference; and once assigned to a particular therapy, they may be motivated to show lesser distress, regardless of the match between them and the therapy or their sense of control.

In the current study, we chose test anxiety treatments as the instrument to test choice option influence over treatment outcome. This choice was made for practical reasons, namely the ability to use short parallel effective protocols of therapy whose effectiveness could be measured in various aspects.

Test anxiety has been a common and universal phenomenon in the civilized world for a long time, especially in the 20th and 21st centuries, which have been characterized by a competitive and achievement-based society (Spielberger & Vagg, 1995). It is estimated that debilitating test anxiety affects 10 to 30% of all students (Wachelka & Katz, 1999). Test anxiety has been regarded as a continuous variable rather than a discrete diagnostic category, present or absent (Zeidner, 1998). Test anxiety is a concept defined differently by different researchers and is perceived as multidimensional and compromised by different, yet interrelated components (Spielberger & Vagg, 1995). Researchers tend to classify the concept into three facets: cognitive (e.g., worry, irrelevant thoughts), affective (e.g., physiological reactions, emotionality), and behavioral (e.g., deficient study and test-taking skills, avoidance) (Zeidner, 1998). One of the various conceptualizations of test anxiety is Sarason's (1984) four-factor model (i.e., worry, tension, test irrelevant thinking, and bodily symptoms) that was used in this study. Students may exhibit all symptoms, some of them, or none of them in test situations (Zeidner, 1998). Test anxiety as measured by different scales is in negative correlation with academic performance as measured in different environments (Zeidner, 1998).

The first step in designing this study was to find different test anxiety treatments that would be similar in their efficiency in treating test anxiety, similar in their attractiveness for the prospective patients, but differing in key elements, thus allowing comparable choice between them. We chose to use progressive muscle relaxation (PMR), representing treatments that are aimed at the emotional facet (bodily symptoms), and changing of internal dialogue (CID), representing treatments aimed at the cognitive facet (worry). The two treatments were found to be equally effective in dealing with test anxiety (e.g., Hembree, 1988; Zeidner, 1998). The study used short versions of the different therapies. Each treatment encompassed two 1-hour sessions, and the patients were given between-session homework assignments.

The study used a three-group design. The choice group participants were asked to choose their preferred treatment and were assigned accordingly. The no-choice group participants were led to believe that they were randomly assigned to one of the treatments but were actually assigned according to their preference. The third group was a wait-list control group.

The aim of this study was to shed light on the inconsistent results regarding the possible effect of

choice of treatment. In this study, participants stated their preference for a specific treatment of test anxiety among options presented to them (their preference was clear and not deduced from the match between therapy characteristics and their characteristics or preferences of therapy characteristics). All the participants received the treatment they preferred and were compared with a control group and not with participants who received treatments they did not choose. This was done because, in practice, we try not to give patients any treatment they do not want. The test anxiety treatments used in this study were real treatments to real people (vs. hypothetical questions about treatment preferences) that could be compared with each other in various measures such as self-reports and performance measures (vs. treatments for various problems that could be compared only by measuring treatment satisfaction).

The main goal of the study was to test the effect of choice of therapy over treatment effectiveness. It is not possible methodically to separate the personal matching explanation from the act of choice, so it was taken as a fact that allowing choice may increase personal treatment–patient matching. The aim of the study was to investigate the influence of control on the possible choice effect by isolating the control factor of choice between treatments and to test the moderating effect of desire of control over choice effect. Finally, the study explores the effect of cognitive dissonance as an alternative explanation for the possible effect of choice over treatment outcome.

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Research Hypotheses

We hypothesized the following:

1. Allocation of participants to different treatment groups (CID and PMR) will produce a decrease in test anxiety as measured by self-report questionnaires and an increase in performance and treatment satisfaction in the treatment groups compared with the control group.
2. Following treatment, no difference will be found in treatment satisfaction, test anxiety, as measured by self-report questionnaires, and performance between the two treatments (CID and PMR).
3. Enabling choice between treatments will result in greater treatment efficacy compared with allocating participants to their preferred treatment without sense of control. Therefore, participants in the choice group will demonstrate greater treatment satisfaction, reduced test anxiety as measured by self-report questionnaires, and higher performance than participants in the no-choice group.
4. When given choice among treatments, participants with a higher desire for control will demonstrate greater efficacy compared with those with lower desire for control. No such differences will be found in participants allocated to treatment by their preference with no sense of control.
5. The effect of choice on treatment outcome will not be attributed to the effect of cognitive dissonance. Thus, there will be no difference in the different treatment evaluations as a result of choosing and undergoing a specific treatment.

Method

Participants

All 73 participants were students who felt they suffered from test anxiety and were not undergoing test anxiety-focused treatment at that time. The subjective feeling of test anxiety was the only criterion for inclusion, although participants' scores for test anxiety at pretreatment were higher than those of normal samples reported in the literature (Benson & Bandalos, 1992; Benson, Moulin-Julian, Schwarzer, Seipp, & El-Zahhar, 1992; Sarason, 1984). All participants were treated during the 2003 academic year, with a mean flow rate of three new participants per week. Respondents who reporting meeting Axis I *Diagnostic and Statistical Manual of Mental Disorders* (fourth edition; American Psychiatric Association, 1994) criteria were excluded. Of the 75 students commencing the study, two did not complete it (one left after the screening meeting and the other after the first therapy meeting). The mean age of participants was 24.16 years ($SD = 2.55$; range = 19–37). The sample included 43 (59%) women and 30 (41%) men; most were single (90%) and Israeli born (81%). The majority of the students were registered for bachelor of arts (92%) degrees in their first (32%) or second (27%) year of study. Most of the students were studying engineering (29%) or social studies (22%).

Therapist

The therapist (Jonathan E. Handelzalts), a doctoral-level psychologist experienced in the treatment of test anxiety, received extensive training in PMR and CID before the commencement of the study and had treated patients in a pilot study. The therapist was blind to participant condition (e.g., whether the participant chose the treatment) and knew only what treatment he should administer. All of the treatment

sessions were taped, and the therapist was routinely supervised by a senior psychologist, Giora Keinan, for adherence to the treatment protocol in supervision sessions.

Treatments

Progressive muscle relaxation. A two-session short PMR protocol was used in the study. The underlying assumption of this method is that emotional arousal is a key factor in test anxiety; therefore, test anxiety levels can be diminished by reducing physiological arousal level (Zeidner, 1998). The method used in the study was a short version of Jacobson's (1938) method combined with guided imagery techniques. The key elements of the original Jacobson (1938) method were used with adaptation for a shorter time procedure. The participants were given an audiotape with instructions to be used at home.

Changing of internal dialogue. The two-session short CID therapy consisted of parts of Meichenbaum's (1972) cognitive–behavioral modification technique. We chose to use the part concerning the change of internal dialogue: the identification of negative and unproductive thought patterns. The therapy is based on the notion that by converting negative and catastrophic thought patterns into positive ones, anxiety levels can be reduced and level of functioning improved. This technique was chosen because of its proven effectiveness and simplicity (Keinan, 1997). Participants were given instructions to write down negative thought patterns and think of positive options in the interval between the two sessions.

Measures

Feeling of Control Scale (FCS). This scale was developed to assess the feeling of decisional control in the various study groups. The scale measures participants' level of decisional control and consists of one question rated on a 7-point scale (1 = *no control at all*, 7 = *full control*): "After witnessing a demonstration of the different treatment options, to what extent do you feel you have control regarding your ability to face tests?"

Heart rate and blood pressure. A DS-175 digital instrument was used to measure heart rate and blood pressure.

Performance test. The participants were told that this examination measured their ability to function under stress, and its result was in correlation with academic success. The first part of the test consisted of sections from the Raven (1938, 1962) Matrices test that are widely used to assess cognitive performance and in studies concerning test anxiety (Allen, Elias, & Zlotlow, 1980). Two parallel versions were used in the two administrations. Sets D and E of the original tests were combined to form both versions. The score for this part ranged from 1 to 12. The participants were instructed to work as fast as they could within the 8-min time limit. The second part of the test consisted of the visual search test (Breznitz, 1978), in which participants were asked to circle a certain digit on a quarto page containing several randomly allocated digits in a 20-second time limit. The more stressed the participants were, the more affected their cognitive organization would be, and they would find it difficult to circle all the digits (Breznitz, 1978).

Reaction to tests (RTT). This was assessed using Sarason's self-report measure, which consists of 40 items designed to measure individual differences in the level of test anxiety as a situation-conditioned personality trait. The four 10-item subscales of the inventory test high worry, tension, test irrelevant thinking, and bodily symptoms as key factors of test anxiety on a 4-point scale. The internal consistency of the four subscales ranged from 0.68 to 0.81, with a total scale reliability of 0.78 (Sarason, 1984). The Hebrew translation was done by four independent translators fluent in both languages (Michaelis, 1990). The reported internal consistency of the four subscales in the Hebrew version ranged from 0.71 to 0.91, with a total scale reliability of 0.91. In the present study, the internal consistency was measured twice. In the first measure, internal consistency of the four subscales ranged from 0.77 to 0.92, with a total scale reliability of 0.90, and in the second measurement the internal consistency of the four subscales ranged from 0.87 to 0.93, with a total scale reliability of 0.91.

Management Improvement Scale (MIS). A self-report measure was developed for the study to measure participants' feelings following treatment regarding improvement in test anxiety level and performance on tests. The scale consists of two questions rated on a 7-point scale (1 = *not at all*, to 7 = *very much*): "How well do you think the treatment you underwent helped you cope with stress associated with test anxiety?" and "How well do you think the treatment you underwent helped you perform on tests?"

Follow-up. A phone interview designed to test the subjective feeling of improvement in test anxiety after the subsequent examination period was conducted 2 months posttreatment. Participants'

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responses are rated on a 5-point scale (1 = *no improvement at all*, 5 = *no test anxiety*).

Desire for Control Scale (DCS). This scale was developed by Burger and Cooper (1979) to assess individual differences in level of desire for control over different life events. The scale consists of 20 items concerning people's preferences for control in different aspects of life. The participants were asked to read every item and to rate the degree to which each characterizes them on a 7-point scale (1 = *not at all*, 7 = *very much*). The reported internal consistency of the scale is 0.8 (Burger & Cooper, 1979). The scale was translated using the back-translation technique (Babani, 1994). The internal consistency of the scale in the current study is 0.68.

Quality of Treatments Rating (QTR). The QTR scale was developed for this study following Borkovec and Nau (1972) to assess a possible change in the attitudes of participants regarding the treatments. It consists of six items, rated on 7-point scale (ranging from 1 [*not at all*] to 7 [*very much*]), designed to assess the extent to which (a) the treatments presented in the study are perceived as logical, fit, effective, and generalizable and (b) participants would be willing to undergo them or recommend them to a friend. Participants from both treatment groups completed the scale at pre- and posttreatment. The internal consistency of the scale in the four administrations of this study ranged from 0.83 to 0.92.

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Procedure

The study was approved by the Tel-Aviv University Ethics Committee. Participants responding to the flyers placed on university bulletin boards or sent through e-mail received a short explanation and met with the research assistant, who assigned them randomly to one of three groups:

Choice group: Participants were allocated to the treatment (PMR or CID) following their choice ($n = 24$).

No-choice group: Participants were given instructions that led them to believe they were randomly allocated to the treatments when, in actuality, they were allocated according to their preference. This manipulation was designed to prevent their feeling of control but nevertheless matching them to their preferred treatment ($n = 25$).

Control group: Participants were allocated to a wait list and were given treatment at the end of the study ($n = 24$).

As to the randomization procedure, participants were allocated to the groups in the order they were recruited. The first one to the choice group, the second to the no-choice group, the third to the control group, and so forth. After a short explanation regarding the study and signing of informed consent, the two treatments were introduced to the participants in a counterbalanced way with two 5-min videos that were filmed for the purpose of the study. In these films, Giora Keinan, a senior psychologist, explained the two treatment options to a patient. The participants completed the RTT, FCS, DCS, and QTR; took the performance test; and had their heart rate and blood pressure measured (all instruments were introduced in a counterbalanced procedure). Then they were assigned to the different treatments according to their group allocation. Following the assignment the participants were contacted by the therapist and the first treatment session was scheduled. The second session was scheduled a week later. At the end of the session, the participants completed the RTT, MIS, and QTR; took the performance test; and had their heart rate and blood pressure measured. The treatments to the control group were administrated at the end of the study. After the subsequent examination term (approximately 2 months), participants were contacted by phone for follow-up.

Data Analysis and Research Design

Differences between groups in demographic variables were examined via chi-square tests and analysis of variance (ANOVA). The choice manipulation effect was examined with independent *t* tests. Differences between treatment protocols were examined via a series of multivariate ANOVAs (MANOVAs). The independent variable was treatment protocol (PMR and CID). The dependent variables were RTT, FCS, MIS, performance test, and blood pressure and heart rate values.

Group differences were tested using a MANOVA, controlling for demographic variables (multivariate analysis of covariance [MANCOVA]) for the following two factors: treatment group (choice, no choice, control) and the repeated factor of time (pre- and posttreatment measurements). A separate MANCOVA was conducted for performance

indexes, physiological indexes, and self-report with posttreatment indexes as covariates.

Further analyses were conducted using ANOVA tests for each significant independent variable, and Sheffé post hoc analyses were conducted to examine differences between groups. In addition, linear patterns were examined for each dependent measure.

Regression approach was conducted to test the moderating effect of desire for control. The independent variables were treatment group (dummy coded), desire for control, and their interaction (calculated by multiplied Z scores), with the various outcome measurements as the dependent variables.

To examine the cognitive dissonance effect, a MANCOVA was conducted for the following three factors: treatment (CID, PMR), group (choice, no choice), and the repeated factor of time (pre- and posttreatment measurements). Dependent variables included the QTR for each of the therapies (whether they participated in it or not).

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Results

No differences were found between treatment groups regarding demographic variables. The nonsignificant effects were as follows: age, $F(2, 70) = 0.77$, $p > .05$, and number of years of academic education, $F(2, 70) = 0.73$, $p > .05$. No differences were found regarding gender, $\chi^2(2, N = 73) = 1.32$, $p > .05$, country of origin (America, Eastern Europe, Western Europe, Africa, Israel), $\chi^2(2) = 0.15$, $p > .05$, marital status, $\chi^2(2) = 0.25$, $p > .05$, level of academic studies (BA, MA, MD, PhD), $\chi^2(2) = 2.53$, $p > .05$, area of study (engineering, social studies, arts, exact sciences, humanities, life sciences, medicine, health), $\chi^2(2) = 2.17$, $p > .05$, past psychological treatment (yes–no), $\chi^2(2) = 2.16$, $p > .05$, or period of onset of test anxiety (elementary school, junior high school, high school, university), $\chi^2(6) = 8.94$, $p > .05$.

Regarding the choice manipulation effect, as measured by the FCS, comparisons between experiment groups showed significant differences, $t(47) = 2.32$, $p > .05$. The choice group reported higher levels of perceived control ($M = 3.04$, $SD = 0.86$) compared with the no-choice group ($M = 2.52$, $SD = 0.71$). A series of MANOVAs were conducted to examine the first hypothesis regarding effect of treatment in general. All treatment groups scored higher than the control group in all the research measures apart from the RTT and Matrices test (Table I), thus establishing the effect of the two treatments used in this study.

To examine the second hypothesis concerning differences between the two test anxiety treatments, a series of MANOVAs found no difference between the two treatments (PMR and CID) used in this study regarding all research variables (apart from the MIS and FCS scales, which were not administered to the control group, who received no treatment at that time). Therefore, in further analysis the two treatment groups were combined.

The following analyses are concerned with the third hypothesis regarding the differences between the study groups (choice, no choice, control) in performance, physiological, and self-report indexes. For the physiological indexes, the main effect of group was significant, $F(6, 128) = 2.89$, $p < .05$, $\eta = .22$. The ANOVA conducted on the physiological indexes score yielded significant main effects for group in the diastolic blood pressure (DBP), systolic blood pressure (SBP), and heart rate (HR) indexes (Table II). In addition, Scheffé tests for pairwise comparison revealed that after treatment DBP, SBP, and HR were lower among the choice group compared with the control group ($p < .05$).

For the performance indices, the main effect of group was significant, $F(4, 134) = 2.89$, $p < .05$, $\eta = .22$. The ANOVA conducted on the performance indexes score yielded significant main effects for group in the visual search test (see Table II). In addition, Scheffé tests for pairwise comparison revealed that after treatment the level of the visual search test score was higher among the no-choice and choice groups compared with the control group ($p < .05$).

For self-report indexes, no main effect was found for RTT (see Table II). For the MIS, a significant effect of group was found. The choice group reported higher levels of improvement than the no-choice group. No significant differences were found for the follow-up call, although the choice group reported greater satisfaction from treatment (see Table II).

Examining differences between all pretreatment physical indexes and posttreatment variables revealed a linear pattern among the groups. The greatest change as a result of treatment was found in the choice group, followed by the no-choice group and the control group (Figure I). Linear patterns examined via polynominal contrasts showed a significant linearity in SBP ($C = 7.20$, $SE = 2.05$, $p < .01$), DBP ($C = 4.43$, $SE = 1.5$, $p < .01$), and HR ($C = 6.31$, $SE = 2.29$, $p < 1.98$).

Examining differences between pretreatment performance indexes and posttreatment variables revealed a linear pattern among the groups. The

Table I. Mean (±Standard Deviation) Differences between Pretreatment and Posttreatment among Treatment ($n=49$) and Control ($n=24$) Groups

Variable	Control	Treatment	F
Visual search test			21.06***
Pretreatment	11.54 (3.90)	11.75 (3.82)	
Posttreatment	12.08 (2.68)	15.08 (3.60)	
Matrices			3.26
Pretreatment	8.20 (1.64)	8.84 (2.17)	
Posttreatment	8.67 (1.58)	9.59 (1.87)	
Systolic blood pressure			12.60***
Pretreatment	124.48 (20.22)	118.65 (18.17)	
Posttreatment	124.17 (21.20)	111.54 (13.89)	
Diastolic blood pressure			9.35***
Pretreatment	76.33 (14.51)	70.20 (9.20)	
Posttreatment	77.38 (14.86)	66.42 (10.29)	
Heart rate			8.70***
Pretreatment	78.92 (11.89)	78.71 (15.86)	
Posttreatment	78.70 (11.86)	72.19 (12.32)	
Reaction to tests			3.59**
Pretreatment	111.83 (10.84)	105.53 (20.89)	
Posttreatment	111.50 (9.92)	99.60 (22.11)	

**$p=.06$. ***$p<.01$.

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greatest change from treatment is within the choice group, followed by the no-choice group and the control group (Figure II). Linear patterns examined via polynominal contrasts showed a significant linearity in visual search test ($C=2.11$, $SE=0.56$, $p<.01$).

Multiple regressions revealed that, contrary to the fourth research hypothesis, desire for control had no moderating effect on group differences in the research indexes. The fifth hypothesis was concerned with the possible cognitive dissonance effect. Cognitive dissonance was assessed by comparing participants' treatment assessment of each treatment before and after treatment administration. MANCOVA revealed no significant main effect or interaction.[1]

Discussion

The choice of psychological treatments for this study was based on the assumption that the two alternatives are viable, comparable, and equally effective treatments for reducing test anxiety as measured by test anxiety measures of the present study. As predicted, in both the groups receiving treatment, there was a significant difference pre- and posttreatment in most of the research measures. This was in contrast to the control group, for which no significant difference was revealed in any of the measures. No differences in treatment efficacy were found between the two treatments (PMR and CID) used in this study. Thus, the results of the present study confirm that assumption and support other studies indicating the equal effectiveness (e.g., Hembree, 1988) of PMR and CID among other treatment options for test anxiety.

The general result pattern arising from the study is that after treatment allocation and the treatments themselves, the choice group showed a better result pattern than the no-choice group and the control group in most of the measures. There was a significant linear pattern, in which the choice group performed better than the no-choice group, which in turn had better results than the control group in the physiological measures and the visual search test. There was a significant main effect for groups in all measures (apart from the Matrices test and RTT), although most of the post hoc comparisons indicated a difference only between the choice and the control group but no difference between the choice and the no-choice group. It could be assumed that with a larger sample these differences that were apparent in the linear relationship would prove to be significant in the post hoc comparisons as well. This result pattern is evident mainly in physiological and performance measures but almost nonexistent in test anxiety self-report measures, although when asked directly using two simple questions (MIS), participants reported treatment satisfaction and a sense of test anxiety relief.

These results are in line with some of the studies mentioned (Devine & Fernald, 1973; Kanfer & Grimm, 1978; Gordon, 1976; Liem, 1975; Mendonca & Brehm, 1983; Renjilian et al., 2001; Rokke & al'Absi, 1992; Rokke et al., 1991; Rokke & Lall,

Table II. Pre and Posttreatment Measures and Pairwise Comparisons of the Three Treatment Groups: Choice ($n=24$), No Choice ($n=25$), and Control ($n=24$)

	Choice		No choice		Control		
Assessment	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*
			Performance indices				
Visual search test[a]							
Pretreatment	12.45	3.68	11.08	3.90	11.54	3.90	0.86 ($df=2, 68$)
Posttreatment	15.96	3.18	14.24	3.84	12.08	2.68	11.20** ($df=2, 68$)
Matrices							
Pretreatment	8.96	2.01	8.72	2.35	8.20	1.64	0.97 ($df=2, 70$)
Posttreatment	9.96	1.73	9.24	1.96	8.67	1.58	2.81 ($df=2, 70$)
			Physiological indices				
Systolic blood pressure[b]							
Pretreatment	125.38	20.72	112.20	12.67	124.48	20.22	4.16* ($df=2, 66$)
Posttreatment	115.79	15.73	107.29	10.45	124.17	21.20	6.30** ($df=2, 66$)
Diastolic blood pressure[b]							
Pretreatment	73.42	9.47	67.12	7.97	76.33	14.51	4.53* ($df=2, 66$)
Posttreatment	68.04	11.25	64.79	9.17	77.38	14.86	5.13** ($df=2, 66$)
Heart rate[b]							
Pretreatment	79.17	15.91	78.28	16.12	78.92	11.89	0.02 ($df=2, 66$)
Posttreatment	70.83	10.42	73.54	14.08	78.70	11.86	4.95* ($df=2, 66$)
			Self-report				
Reaction to tests							
Pretreatment	111.25	21.27	100.04	19.35	111.83	10.84	3.45* ($df=2, 72$)
Posttreatment	102.24	25.24	96.56	18.80	111.50	9.92	1.79 ($df=2, 72$)
Management Improvement Scale[c]							
Posttreatment	5.26	1.13	4.26	1.32			7.83** ($df=2, 69$)
Follow-up call							
Posttreatment	4.26	0.86	4.14	0.91			2.05 ($df=2, 69$)

Note. Notations are provided for pairwise comparison for each variable: [a]choice, no choice > control; [b]choice < control; [c]choice > no choice. *$p<.05$. **$p<.01$.

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1992) but contrary to others (Bakker et al., 2000; Murray, 1976; Pilkonis et al., 1974; Rokke et al., 1999; van Dyck & Spinhoven, 1997). The fact that success of psychological treatment can be augmented in some ways by allowing choice between options, as evident in this research, confirms the notion that when given knowledge and information, patients can choose and by that improve their results following test anxiety treatment.

This result pattern confirms the hypothesis that a sense of control constitutes a main part of choice effect. Participants in both groups were allocated to their preferred treatment; therefore, the personal matching explanation applies to both groups. The participants in the choice group were the only ones who were able to feel and actually control the kind of treatment they received. In fact, this group reported a greater feeling of control than the other groups, as reported in other studies (e.g., Rokke et al., 1999). The feeling of control (vs. control in reality) was the only variable different between the two research groups and is, therefore, responsible for the difference in study measures. These results support the abundance of research results indicating that control is associated with various positive factors such as well-being, psychological adjustment, and so on (Burger, 1989; Wallhagen, 1998).

Control, as measured in this study, is a unique variable because it refers to the choice *felt* by the participants, as both study groups had *actual* control over treatment allocation. The result pattern indicates that in this study the feeling of choice had a greater effect on treatment outcome than the actual choice by itself (getting the preference stated). It is important to note that one cannot conclude that control is the only facet influencing choice, because it is operationally impossible to enable people to feel choice without the feeling of control; therefore, it is impossible to isolate the control facet of choice from other facets.

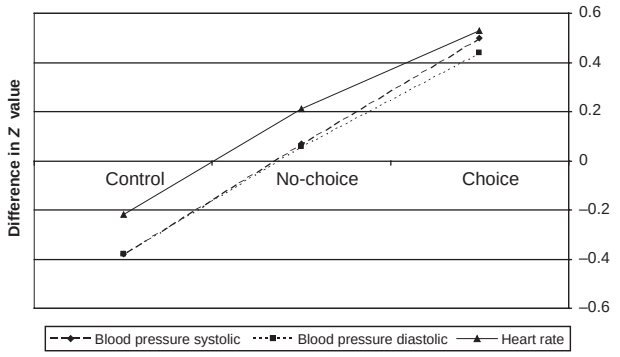

Figure I. Linear patterns of pretreatment–posttreatment differences in physical indexes for research groups. Mean *Z* scores of pretreatment and posttreatment were calculated and polynominal contrasts examined.

Despite these results, the participants' desire for control (Burger, 1993) did not affect the result pattern, contrary to the study hypothesis, and participants who were motivated to see themselves in control did not benefit more than others from getting this control in reality. Because sense of control affected results, the fact that desire for control did not have the same effect is surprising and could be explained by the low internal consistency of the scale in the present study (0.68). Another possible explanation for the lack of effect could be that no item in this scale deals with therapy or other health care decisions, and the issue of desire for control should be assessed specifically regarding the domain tested. Thus, the DCS, because of its general content, might not be suitable for the purpose of this study, which dealt with specific health care decisions.

The result pattern indicates that the difference between groups as a result of psychological treatment could not be attributed to a change in attitudes

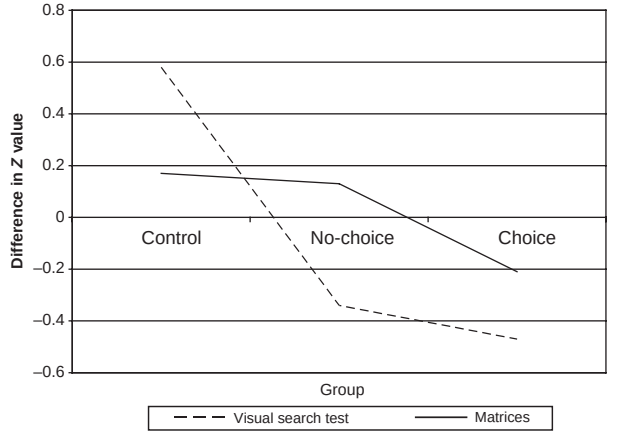

Figure II. Linear patterns of pretreatment–posttreatment differences in performance indexes for research groups. Mean *Z* scores of pretreatment and posttreatment were calculated and polynominal contrasts examined.

regarding treatments as a result of a cognitive dissonance (Festinger, 1957) that stemmed from the effort invested in psychological treatment (Axsom & Cooper, 1985). Participants did not change their evaluation of treatments no matter what treatment they chose or discarded. The choice of treatment resulted in augmented change that could not be attributed to a change in attitudes toward the treatment selected or the treatment that was rejected.

A surprising result was the difference between physiological and performance measures that demonstrated improvement in various ways, as opposed to self-report measures that exhibited almost no significant difference between treatment and control groups. In other words, there was no treatment effect evident when measured by self-report measures. According to the study results, there was no connection between subjective feeling of test anxiety and performance in "hard-core" measures of test simulation. It should be noted that when asked in a more holistic self-report measure (MIS) about their general satisfaction from the treatment (self-report measure), participants did report a subjective relief in test anxiety feeling, and the choice group reported a higher degree of satisfaction than the no-choice group. In the follow-up call, the choice group reported a greater satisfaction from treatment than the no-choice group, although the difference was not significant.

A possible explanation for this result pattern is that participants found it difficult to address change regarding particular questions dealing with test anxiety such as in RTT (e.g., "Before and during examinations I sometimes tremble"), and their answers in the before and after administrations did not change, regardless of whether their actual performance had changed. It is possible that they could better assess their feelings regarding stress-level change when asked holistic and global questions regarding their feeling about test anxiety as asked in follow-up questions (e.g., "How would you assess your stress level regarding tests compared with previous times?"). It is possible that participants in this study felt threatened and overwhelmed by particular questions regarding test anxiety and could not estimate the change in test anxiety that was evident in physiological and performance measures.

With regard to performance measures, the visual search test (Breznitz, 1978) yielded significant results in most of the statistical analyses, and thus could be considered a sensitive measure for detecting change in test anxiety levels after treatments in various allocations. The Matrices test (Raven, 1938, 1962) did not yield significant results; only the choice group demonstrated improvement following treatments. This test was chosen because

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it reflects general intelligence, fluid intelligence, abstract reasoning, and inductive reasoning (Bors & Vigneau, 2003), and it was hypothesized that results would be affected by stress and would be sensitive enough to detect change after treatment. Although the Matrices test results were found in other studies to be affected by stress (Kumari & Corr, 1998), these tests reflect general intelligence and thus may not be sensitive enough to detect the change after treatment in various allocations, as was evident in the present study.

Limitations

Some limitations concerning this study must be acknowledged. This study addressed choice as modulated by a particular facet: control. Future research should be focused on addressing other facets such as matching. Such research could compare groups of participants in different matching procedures, isolating and finding connections between different aspects of matching, such as type of patient, type of therapy, and so on (see also Beutler & Harwood, 2000).

The choice of treatment effect was demonstrated in this study in a particular psychological disturbance, test anxiety, using particular treatments (PMR and CID) with particular participants (university students). These particular treatments were chosen because they can be easily administered within short periods of time and participants in need of these treatments (i.e., students) can be recruited easily. Therefore, the results of this study are limited to these very specific conditions. Further research is needed for a variety of psychological disturbances using other treatment modalities and different kinds of participants in order to generalize the results of the present study.

Another limitation is the use of test stimulation rather than actual tests. This was done because of the difficulty in comparing test results of students from different study fields. Simulation of reality is a difficult task, yet when done according to accepted guidelines, as in this research, can serve as a valid measurement (Zeidner, 1998). Still, for a better generalization, a study using reality measures could be of importance.

The relatively small sample ($N = 73$), modest for a design that incorporated two treatments and three groups, might have contributed to the lack of findings regarding some of the hypotheses. A larger sample may have revealed more differences between treatment groups or demonstrated the moderating effect of desire for control.

A final limitation is the lack of systematical monitoring of the treatments for consistency with the treatment protocol that was chosen by the participants. Although closely supervised by Giora Keinan for adherence to the treatment protocol in supervision sessions, no systematic monitoring was done to ensure that protocols were followed and that no other components from other therapies were added to the chosen therapy.

Contributions and Implications for Practice and Research

The study replicated past results regarding lack of difference between the two different test anxiety treatments used in this study. Therefore, these two treatments can be suggested as effective treatments for test anxiety when used independently or in combination.

This study fits well into the field of research of factors affecting treatment outcomes. The two main approaches to explain the fact that no differences are found when comparing different treatments (Lambert, 1992; Luborsky et al., 2002; Wampold et al., 1997) are the one trying to isolate specific factors in different therapies and the one trying to locate factors common to all therapies (Beutler, 2002; Chambless, 2002; Luborsky et al., 2002; Messer & Wampold, 2002; Rounsaville & Carroll, 2002; Schneider, 2002). The present study results could bridge the gap between the two approaches by isolating a common factor, choice, that is implemented between specific treatments and isolating the specific factors relevant for the individual choosing.

Therefore, by allowing patients to choose between well-established therapeutic techniques after explaining and demonstrating these techniques to them, the efficacy of these techniques could be augmented without changing the technique protocol. Furthermore, the study results suggest that by giving clients a sense of control and information about treatments, the efficacy of the treatments could be augmented. Sense of control can be given in various ways (e.g., by allowing clients to choose the therapist, the therapy schedule). These options could be tested in future studies.

A final point is the difference that was found between self-report and actual performance measured in this study. A possible recommendation arising from this result is that researchers should try to use both measures in order to get the whole picture regarding the topic they are studying.

Note

[1] Detailed statistics of all non-significant findings can be furnished by the authors upon request.

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