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Vol. 38(1-4), 1991

Published for the Institute by The Durable Press
RESEARCH REPORT

Changes in Mode of Control and Self-control for Post Myocardial Infarction Patients
Evidencing Type A Behavior:
The Effects of a Cognitive/Behavioral Intervention and/or Cardiac Counseling

Deane H. Shapiro, Jr. Ph.D., Meyer Friedman, M.D., and Gerald Piaget, Ph.D.

A control model of psychological health was utilized to assess the effects of a cognitive/behavioral intervention and/or cardiac counseling with post myocardial infarction patients evidencing Type A behavior. A previously developed four quadrant control inventory measuring perceived mode of control and perceived self-control was given to groups in two sections of the Recurrent Coronary Prevention Project. The experimental group (coronary counseling plus cognitive/behavioral intervention) was tested after one year (E1) and two years (E2) of treatment. The cardiac counseling group was assessed only after two years (C2). As hypothesized, the cognitive/behavioral treatment section at E2 had a significantly higher overall satisfaction level and congruence between real and ideal self on each of the four quadrants than at E1, and than the cardiac counseling only (C2). Further, on each of the four quadrants, E2 had a psychologically healthier mode of control profile than the cardiac counseling only (C2); and a healthier profile on both the positive assertive and positive yielding mode of control than at E1. Finally, E2's self-control score was significantly higher than C2's. Comments on future directions in measuring perceived control, and on the relationship of control and Type A behavior are offered.

INTRODUCTION

Previous research has developed a four quadrant control model of psychological health, and examined its reliability and validity with a variety of clinical as well as normative populations. This work has shown that a "sense of control" can come from either active, assertive modes of control (quadrant one) or from yielding, accepting modes of control (quadrant two). In terms of the latter mode, it was noted: "More of a sense of control may be gained from letting go of active control (acceptance) than continuing efforts to try to change that over which we do not have control." 9

To determine ways to modify, enhance, and facilitate human behavior and cognitions in either mode, several different self-control strategies - ranging from meditation to behavioral self-management - have been investigated.2 4

The results have shown that a sense of control1 5 (from both modes) can affect both physical and emotional wellbeing, and that psychological health involves a combination of increasing quadrants one and two (positive assertive and positive yielding) and decreasing quadrants three and four (negative assertive and negative yielding).6 7

This current study, which was part of the Recurrent Coronary Prevention Project (RCPP), is an attempt to extend the findings on modes of control to determine their applicability and relevance to the Type A behavior pattern. Issues of personal control have been hypothesized to be an important variable in health psychology and behavioral medicine in general8 and in Type A behavior in particular.5 9 10 Since the early pioneering work of Friedman and Rosenman,11 the effects of the Type A Behavior pattern on cardiovascular disease have been examined in hundreds of
epidemiological, clinical, laboratory, and pathologic studies. These studies were reviewed in 1981 by a panel convened by the National Heart, Lung, and Blood Institute which stated that Type A behavior was an independent coronary risk factor. To determine whether this association was causal, cognitive/behavioral strategies have been applied to healthy individuals with a Type A behavior pattern and subsequent work by Friedman, Thoresen and colleagues in the Recurrent Coronary Prevention Project showed that reductions in the intensity of Type A behavior in individuals with one myocardial infarction could be accomplished through the use of cognitive/behavioral interventions; and that this reduction had an effect on subsequent morbidity and mortality over the course of the 4 and 1/2 years of the study.

For a number of reasons, including failure by other long term studies to replicate these findings, as well as problems in assessment, subsequent research is attempting to carefully assess and differentiate the toxic aspects of Type A behavior from the inert. Two of the identified components of Type A behavior - time urgency and easily aroused free floating hostility - may be understood as reactions to being thwarted in efforts to gain control by active, assertive means which could lead to too active efforts at controlling (a high quadrant three, negative, overcontrol); and a lack of trust in oneself, others, and the world around (a low quadrant two, positive yielding). Therefore, based on a control-related understanding of Type A behavior, it was hypothesized that the control profile of a person exhibiting Type A behavior would have a high quadrant one (positive assertive) and high quadrant three (negative assertive) mode of control; a low quadrant two (positive yielding) and a low quadrant four (negative yielding) mode of control; a low satisfaction (self/ideal) congruence on these four modes; and a low perceived self-control score (particularly after a myocardial infarction).

Based on this, three hypotheses were generated about what the control-related effects of a successful intervention for an individual exhibiting Type A behavior would be:

1) Based on Friedman's observation that the qualities of Type A - hostility and time urgency - both stem from and are sustained by "insecurity and inadequate self-esteem," it was hypothesized that a successful intervention would involve individuals feeling more satisfied with their mode of control profile (a greater real/ideal congruence) with less perceived striving to be other than they are. This would be true for each quadrant and across all four quadrants.

2) A successful intervention would involve an increase in quadrant two (positive yielding: trust, acceptance) as well as, to a lesser extent, quadrant one (positive assertive); and a decrease in quadrant three (negative assertive, overcontrol), as well as, to a lesser extent, quadrant four (negative yielding, too little control).

3) A successful intervention would involve an increase in feelings of overall perceived self-control.

For #'s 1-3 above, it was hypothesized that these changes would be more directly affected by the cognitive/behavioral intervention and cardiac counseling (E) than by cardiac counseling alone (C); and that the changes would be more pronounced after two years of the cognitive behavioral intervention (E2) than after one year (E1).

**METHODOLOGY**

**SETTING/SUBJECT SELECTION**

All participants were part of the RCPP project. These subjects were "recruited over a twelve month period, had one or more documented myocardial infarctions six months or more earlier, were sixty-four years of age or younger, either had never smoked or had quit for six months or longer, and had never been treated for or exhibited any signs of diabetes mellitus." The intensity of their Type A behavior was diagnosed through the use of both a self-report questionnaire and a video taped clinical interview administered by a clinical consultant who was blind to the treatment status of the patients.

**INTERVENTION SECTIONS**

Individuals were than randomly assigned to two sections: 1) cardiac counseling (consisting of twenty-two groups); and 2) cardiac counseling plus cognitive/behavioral intervention (60 groups). The cardiac counseling group consisted of "advice and information concerning diet, exercise, drugs, possible surgical regimens, and cardiovascular pathophysiology. The Type A behavioral counseling interventions included "progressive muscle relaxation, behavior alteration techniques changes in certain belief systems, restructuring of various environmental situations, cognitive/affective learning."

For this study, three of the twenty-two groups which received only cardiac counseling (N=39), and two of the sixty groups receiving the experimental intervention (N=22) were selected.

**SUBJECT DEMOGRAPHICS**

Overall demographic information for the two sections in the RCPP have been described elsewhere. The demographics of the groups used in this sample are similar to those demographics, and there were no significant differences between sections. The mean age of the experimental group (N=22) was 53.5,91% were men, all had a high school education and 91% had finished college; all were white; 91% were married, 9% were divorced; 86.4% were in either management or a profession, three were retired, the average income was greater than $29,000; all had a religious affiliation (55% Protestant, 19% Catholic, 18% Jewish, 9% Unitarian). The mean age of the cardiac counseling group...
Figure One

Mode of Control: Percent Satisfaction

<table>
<thead>
<tr>
<th>Quadrant One</th>
<th>Quadrant Two</th>
<th>Quadrant Three</th>
<th>Quadrant Four</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Assertive</td>
<td>Positive Yielding</td>
<td>Negative Assertive</td>
<td>Negative Yielding</td>
<td>Cardiac counseling only at year two</td>
</tr>
<tr>
<td>48.3%</td>
<td>52.1%</td>
<td>55.6%</td>
<td>63.7%</td>
<td>53.3%</td>
</tr>
<tr>
<td>36.2%</td>
<td>40.8%</td>
<td>37.2%</td>
<td>42.1%</td>
<td>45.4%</td>
</tr>
<tr>
<td>38.6%</td>
<td>38.6%</td>
<td>42.2%</td>
<td>40.6%</td>
<td>45.4%</td>
</tr>
</tbody>
</table>

Cardiac counseling only at year two
Cognitive/behavioral intervention plus cardiac counseling at year 1
Cognitive/behavioral intervention plus cardiac counseling at year 2
### TABLE ONE

FOUR QUADRANT MODE OF CONTROL AND SELF-CONTROL

<table>
<thead>
<tr>
<th>PERCENT SATISFIED</th>
<th>MEANS (SD)</th>
<th>SELF CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrant 1</td>
<td>Quadrant 2</td>
<td>Quadrant 3</td>
</tr>
<tr>
<td>Positive Assertive</td>
<td>Positive Yielding</td>
<td>Negative Assertive</td>
</tr>
<tr>
<td>SECTION ONE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C2) n=39</td>
<td>After 2 Yrs</td>
<td>46.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.45)</td>
</tr>
<tr>
<td>SECTION TWO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(E1) n=22</td>
<td>After 1 Yr</td>
<td>52.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.45)</td>
</tr>
<tr>
<td>(E2) N=11</td>
<td>After 2 Yrs</td>
<td>56.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.17)</td>
</tr>
</tbody>
</table>

a Quadrant two: (E2 vs. C2): 1 tailed \( p = .020 (z = -2.04); \)
(E2 vs. E1): 1 tailed \( p = .030 (z = 1.87); \)

b Quadrant four: (E2 vs C2): 1 tailed \( p = .0295 (z = -1.89); \)

c Overall Satisfaction: (E2 vs. C2): 1 tailed \( p = .030 (z = -1.80); \)
(E2 vs. E2): 1 tailed \( p = .046 (z = -1.68); \)

d Quadrant one words: E1 vs. E2: 
communicating needs: 1 tailed \( p = .014 (z = -2.201); \)
confident: 1 tailed \( p = .034 (z = -1.826); \)

e Quadrant two words: E1 vs. E2: 
trusting: 1 tailed \( p = .022 (z = -2.023); \)

f Self-Control: (C2 vs E2): 1 tailed \( p = .007 (z = -2.438); \)
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(N-39) was 55.5, all were men; 92.3% were white; 94.8% were married (one divorced, one separated); 92.3% had finished high school and 82.1% had finished college; 92.3% had a religious affiliation (45% Protestant, 25% Catholic; 10.2% Jewish) and 7.6% were agnostic/atheist. 79.5% were in management and/or the professions, 18% were retired, and 1 was on disability; the mean income was over $27,000.

FOUR QUADRANT MODE OF CONTROL INSTRUMENT

The four quadrant mode of control inventory is based on prior research into the two positive and two negative modes by which individuals can gain control and a sense of control. Factor analytic, rater reliability, and validity studies of the instrument have been reported elsewhere. Positive assertive (quadrant one) involves the ability to alter the environment, others, and oneself; and words include “decisive,” “communicating needs,” “leading.” Positive yielding (quadrant two) involves knowing when a sense of control needs to come from letting go, trusting, and accepting; and words include “patient,” “trusting,” “accepting.” Quadrant three (negative assertive) involves too much active control, and words include “manipulating,” “overcontrolling,” “doggmatic”. Quadrant four, negative yielding, involves too little control, and words include “indecisive,” “manipulated,” “timid.”

The mode of control inventory consists of 49 words reflecting these four different quadrants. Subjects describe themselves on a four point Likert-type scale (“describes me not well at all” to “describes me exceedingly well”). Subjects then say whether they would like to be more that way, stay the same, or be less that way. The percent of “stay the same” provides a “self-acceptance,” self satisfaction, real/ideal congruence score for each of the four quadrants, and overall total across the four quadrants. Finally, since the mode of control can be a measurement of different types of “self-control” the fiftieth word of the inventory is “self-control.”

DATA COLLECTION AND ANALYSIS

Data were collected using the four quadrant mode of control inventory on the two different sections as follows: 1) Section one, the cardiac counseling groups (C) was assessed after two years (C2); and 2) Section two, the cognitive behavioral intervention plus cardiac counseling groups (E) was assessed after one year (E1) and two years (E2).*

Comparisons were made between percent satisfaction (wanting to stay the same) and mean score for the four quadrants of “mode of control”; for the mean score of “self-control” under the following conditions: 1) Between groups (E2 vs C2): to control for the effects of time, cardiac and cognitive/behavioral intervention after two years (E2) was compared to cardiac counseling only after two years (C2); 2) Within subjects (E1 vs E2): to assess within subject changes resulting from the length of the intervention, (E2) was compared to (E1). Because of the size of the N, all statistical analyses were non-parametric: Mann-Whitney U (E2 vs C2); and Matched-Pairs Signed Rank Test (E1 vs E2).

RESULTS

MODE OF CONTROL: 4 QUADRANTS

Satisfaction.

As predicted by hypothesis 1, across all four quadrants measuring mode of control, the E2 group showed significantly more congruence between real and ideal than C2 (p<.05); and this percentage of overall satisfaction score was also significantly higher for E2 than for E1 (p<.05). As can be seen from Figure One and Table One, these results hold true for all four quadrants, and are significant (p<.05) for quadrants two and four.

Mean.

Figure Two shows a mean normative profile for the four quadrant mode of control. The grey shaded bar represents what mental health professionals said a profile of a person with high psychological health would look like in each of the four quadrants. The dark black bars show a mean normative profile taken from a population which has had no history of psychiatric illness in their own or their families’ lives.

As predicted by hypothesis two, as a result of a successful intervention, mean scores for quadrant one and two should rise, and mean scores for quadrants three and four should fall. As can be seen from visual inspection of Figure Two, in each of the four quadrants, the profile of the subjects in the cognitive/behavioral E2 intervention was “healthier” than that of the cardiac counseling C2; quadrant one and quadrant two scores were higher, and quadrant three and quadrant four scores were lower. Further, the profile of the cognitive/behavioral intervention was “healthier” after two years (E2) than after one year (E1) for the two positive quadrants, positive assertive, and positive yielding. Although these results overall were not statistically significant, they were, as noted, in the expected direction.

SELF-CONTROL: MEAN

Previous research has shown that the normative self-control profile of a person with high psychological health, as

*Some subjects who took the control inventory at E1 were not available to take the followup at E2. Although there were no statistical differences between those E1 subjects who also took the test at E2 and those who did not, statistical tests presented in this paper comparing E1 vs E2 are based only on those who completed the test both times.
Figure Two

Mode of Control: Means

- Quadrant One
  Positive Assertive
  - Cardiac Counseling only at year 2
  - Cognitive/behavioral intervention plus cardiac counseling at year 2
  - Normal population with no history of psychiatric illness
  - Mental health professionals' view of individual with high psychological health

- Quadrant Two
  Positive Yielding

- Quadrant Three
  Negative Assertive

- Quadrant Four
  Negative Yielding
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described by mental health professionals, is 3.42. As can be seen from Table One, the mean score of C2 was 2.49, of E1 was 2.86, and of E2 was 3.18. As predicted by hypothesis three, the experimental group’s (E2) mean self-control score was significantly higher than C2’s (p<.01); and the difference between E2 and E1, though not significant, was in the expected direction.

DISCUSSION

The results of the RCPP showed that a cognitive/behavioral intervention was successful in reducing Type A behavior, and that this reduction affected morbidity and mortality.16-19 This study shows that the successful intervention is reflected in mode of control and self-control as follows: 1) shifts in mode of control in all four quadrants in a psychologically healthy direction; 2) increased self-acceptance and congruence between real and ideal on all four quadrants; 3) increased feelings of perceived self-control.

Part of the constellation of time urgency and hostility, which are involved in Type A behavior may be understood as a result of trying to make things other than they are; a fight with time to accomplish more; an anger at self and other when events and tasks do not go as smoothly, expeditiously, and predictably as they should. This is evident in the C2 profile of low quadrant two and high quadrant three scores. Visual inspection of Figure Two shows that the Type A group profile for C2 is, as predicted, further from the healthy norm in quadrant two (positive yielding) than in quadrant one (positive assertive); and further from the norm in quadrant three (negative assertive)** than in quadrant four (negative yielding).

One aspect of changing Type A behavior involves learning that a sense of control comes not only from the assertive, active mode of control, but also from a yielding, accepting mode. The cognitive/behavioral intervention of Section 2(E) helped right the balance. This occurred in three ways. First, there was a shift in modes (C2 vs. E2) toward a more psychologically healthy profile, with quadrants one and two increasing, and quadrants three and four decreasing. In line with this it is interesting that of the three individuals words which achieved significance (E2 vs. E1), two were from quadrant one - communicating needs and confident (P<.05) - and one was from quadrant two trusting (P<.05). These are all important words given recent research.19,23 The section two cognitive/behavioral intervention addressed both quadrants. This helps further confirm the thesis that psychological health is a balance of quadrants one and two, and an ability to use the skills of either as is situationally appropriate. This study shows that that balance may be helpful in ameliorating the morbidity and mortality associated with the Type A behavior pattern.

Second, there was an increased acceptance by the subjects of “who they were” - an increased satisfaction and congruence between real and ideal self. It appears that one of the functions of the section 2(E) intervention was to help these individuals accept themselves. The connection between that self-acceptance and time urgency and hostility is obvious. If individuals feel a sense of acceptance with themselves as they are, then the need to fight the clock, or the need for anger and hostility when crossed or thwarted would decrease, thereby diminishing behavioral reactivity15,34 and increasing self-esteem.19

Third, there was a shift in perceived self-control. The section two (E) group moved significantly closer to the normative profile of a person with high psychological health.

What response can be made to the fact that even though the mean mode changes were in the expected direction, they were not significant, either between C2 vs E2 or between E1 versus E2? This study, by the nature of its design, presents a conservative estimate of the changes in the four quadrant mode of control. This is true for two reasons. The first reason affects the E1 vs E2 comparison. As has been previously reported by Friedman and colleagues,18,19 over the four and one-half years of the RCPP study, there was a 35.1% reduction in Type A behavior in the section two (cognitive/behavioral intervention). However, the majority of that change (64%) occurred in the first year (with another 10.3% the second year). Thus, E1 is measuring individuals who had already reduced their Type A behavior by 22.5%, and the change between E1 and E2 of this study only reflects a 3.6% change in behavior. (Since satisfaction scores continued to rise, it is possible that the first year reflected the largest change in behavior, and the second year an increase in cognitive satisfaction with where the person was, an acceptance of the limits of a person’s ability to make behavioral change).

The second reason affects the C2 vs. E2 comparison. For C2 to be an actual baseline control group, one would expect no change in Type A behavior over the two years of cardiac counseling. However, the cardiac counseling group also decreased in Type A behavior over the course of the

**In hundreds of administrations of the mode of the control inventory, it is customary for subjects who are not satisfied with their quadrant mode to wish to increase the qualities of quadrant one and quadrant two, and to decrease the qualities of quadrant three and four. In that regard, it was quite an interesting finding that over 10% of the items in quadrant three (negative assertive) were endorsed in a non-expected direction by C2, with subjects saying they wanted to be "more" that way. The percentage of items for which the C2 group wanted to be "more" that way for quadrant three was significantly higher for C2 than for E2 (1 tailed p=.023, z=-1.993).**
study (by 9.8%). Of that change, 80% occurred during the first two years so that the C2 section actually reflected a group of individuals who had 7.8% less Type A than upon entering the study.

In terms of future directions, just as research is refining the Type A behavior pattern into components (e.g., time urgency, hostility), research needs to continue to refine the construct of control. This study looked only at mode of control (i.e. assertive or yielding). But control is a process, and mode of control is only one element of that. Therefore, future research should investigate other species of control (e.g., fear of loss of control; desire and need for control)\textsuperscript{19,35} dimensions of self-control\textsuperscript{28,29} and this assessment should be multi-method.\textsuperscript{26,37} In so doing, a refinement of control-related interventions could be even more precisely matched to the nature of the clinical problem and skill deficit being addressed. In this way it would be possible to develop and tailor clinical interventions not only for Type A behavior\textsuperscript{34} but for other clinical populations where control is an important variable.\textsuperscript{40}

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INDEX TERMS
Type A Behavior; myocardial infarction; control; self control

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