

Effects of Hostility, Social Support, and Task Difficulty on Cardiovascular Reactivity

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This study investigated the interaction effect of hostility and social support on CVR in a provocative experimental situation and tested the two models of social support (Cohen & Syme, 1985) by manipulating the stress level with task difficulty. One hundred and twelve male college students who scored high or low on the cynicism score of MMPI Ho scale were randomly assigned to one of two social support (support vs. no support) and one of two task difficulty (high vs. low) conditions. They were confronted by a provocative confederate during their task performance. CVR was measured every minute by systolic (SBP) and diastolic (DBP) blood pressures and pulse rate (PR) over baseline, provocative stress, and recovery periods. For low-hostility participants, the supported group exhibited significantly smaller increases in DBP than the nonsupported group during the provocative stress period. The opposite effect on SBP was observed for high-hostility men. An unexpected finding was that low-hostility men compared with high-hostility men exhibited more exaggerated SBP and DBP when they were not supported. Whereas the nonsupported group in the high-difficulty condition exhibited more increased SBP and PR during the stress period than the nonsupported group in the low-difficulty condition, there was no difference between the two difficulty conditions in terms of CVR for the supported group. During the recovery period, the supported subjects were recovered more quickly in SBP than the nonsupported, regardless of their level of hostility and the task difficulty they had been exposed to. This study provides an experimental evidence of the potential cardiovascular benefit of social support moderated by hostile attitude, and supports two models of social support. It also showed that high-hostility people do not always show more heightened CVR in response to experimental stress, for which a possible explanation (i.e., low voluntary commitment) was provided.

Cardiovascular disease (CVD) is the number one killer in the United States, accounting for 40% of all deaths (Taylor, 1995). It is also among the five leading causes of death in Korea. CVD is a

major chronic disease. Many people in this century live with its symptoms. Given its high frequency, the toll it takes on relatively young people (it occurs well before age 75), and resulting economic loss, finding the causes and cures of the disease would be a major challenge to health researchers

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Many researchers in this field have been looking for the risk factors of CVD and identified anger and hostility as major psychological factors contributing to CVD. Systematic studies on the relationship between anger or hostility and CVD were initiated with the Type A Behavior Pattern (TABP) suggested by Friedman and Rosenman (1974). The TABP is a complex of behaviors including extreme ambition, competitiveness, impatience, aggressive and hostile behavior, and a sense of time pressure. Although some longitudinal studies, such as Western Collaborative Group Study (Rosenman, Brand, Jenkins, Friedman, Strauss, & Wurm, 1975) and Framingham Study (Haynes, Feinleib, & Kannel, 1980) proved the association between TABP and prevalence of coronary heart disease (CHD) by the late 1970s, negative findings also emerged after 1980s. As a result, some researchers began to divide the construct of TABP and found that the critical component of TABP is the Potential for Hostility (Dembroski, MacDougall, Costa, & Granditis, 1989; Schekelle, Hulley, Neaton, Billings, Borhani, Gerace, Jacobs, Lammers, Mittlemark, & Stamler, 1985). Although some negative findings have been reported (e.g., McCrane, Watkins, Brandman, & Sission, 1986), many cross-sectional and some longitudinal studies have replicated that chronic anger and hostility are significantly associated with cardiovascular disease.

However, in spite of these findings, there are considerable ambiguity and inconsistency with regard to how these constructs should be defined and measured. Spielberger, Johnson, Russell, Crane, Jacobs, & Worden (1985) have proposed the working definition of these constructs; anger refers to an emotional state that consists of feelings that vary in intensity, from mild irritation or annoyance

to fury and rage, while hostility is a complex set of attitudes that motivate aggressive behaviors directed toward destroying objects or injuring other people. In contrast, Barefoot (1992) has used hostility as a more comprehensive concept. He suggested that hostility has three components; emotion, cognition and behavior. Anger, annoyance, resentment, disgust, and contempt may be included in the emotional component of hostility, cynicism or hostile attribution in the cognitive component, and aggression in the behavioral component. Although researchers have used somewhat different definitions of anger/hostility, there is considerable consistency in viewing hostility, especially cynicism and hostile attribution, as a stable cognitive variable.

How to measure hostility has also been controversial. Among many measures of hostility, the MMPI Ho scale (Cook & Medley, 1954), a self-report measure, has been most frequently used. But what it actually measures has been a subject of debate. To complicate matters, the Ho scale does not appear to have an internal structure that is invariant across samples and analytic procedures (Barefoot, Dodge, Peterson, Haney, & Williams, 1986; Costa, Zonderman, McCrane, & Williams, 1986; Greenglass & Julkenen, 1989; Smith & Frohm, 1985). A general agreement among researchers is that the core of the Ho scale comprises items reflecting cynicism and mistrust of others (Barefoot & Lipkus, 1994).

How hostility leads to CVD? Some possible mechanisms connecting hostility to CVD have been suggested (Smith, 1992). One of them is the Psychophysiological Reactivity Model, which proposes that hostility contributes to cardiovascular, and perhaps other, diseases through its association with heightened cardiovascular and neuroendocrine

reactivity. In brief, this model suggests that hostile people display larger increases in blood pressure, heart rate and stress-related hormones in response to potential stressors. A small but growing literature suggests that cardiovascular reactivity (CVR) may indeed be a pathogenic mechanism (Beere, Glagov, & Zarins, 1984; Manuck, Kaplan, & Clarkson, 1983).

A number of studies were conducted to investigate the association between the Ho scale and CVR. Generally, high Ho subjects exhibit greater CVR than low Ho subjects in interpersonally stressful situations (Houston, 1994). Preliminary evidence also suggests that other individual differences (e.g., defensiveness) may moderate relations between Ho scale score and CVR (Shapiro, Goldstein, & Jamner, 1995). In addition to the nature of stress stimuli, a variety of situational factors have been found to influence the magnitude and pattern of CVR in experimental situations. For example, active coping, or an effortful attempt to secure reward and avoid or escape punishment, produces more increased CVR than passive coping (Smith & Christensen, 1992). The magnitude of CVR also appears to be a curvilinear function of task difficulty; extremely easy and impossible tasks elicit smaller amounts of CVR than do moderately difficult task (Light & Obrist, 1983; Wright, Contrada, & Patane, 1986).

Along with hostility, social support is among the most frequently studied psychosocial factors in research on cardiovascular disease. But there is little agreement on the definition of social support. Silver and Wortman (1980), avoiding unitary definitions, suggested that the following components characterize the concept: the expression of positive affect; expression of agreement with or acknowledgement of the

appropriateness of a person's beliefs, interpretations, or feelings; encouraging the open expression of such beliefs and feelings; the provision of material aid; and providing information that the distressed person is part of a network or system of mutual obligation or reciprocal help.

Although the literature to date points to a link between social ties and cardiovascular risk, the exact mechanism explaining such a relationship remains unexplored. There are at least two pathways by which social support might exert such an effect: Stress-Buffering Model and Main Effect Model (Cohen & Syme, 1985). The former assumes that stress leads to poor health outcomes and social relationships buffer the impact of stress. Accordingly, this model predicts that social support is effective only under high stress conditions. The latter assumes that social relationships have influence on health outcomes and stress is the only one of several factors that impact upon health. Therefore, the Main Effect Model predicts that social relationships enhance health and well-being independently of the levels of stress. There are some studies showing that social support lowers cardiovascular reactivity to laboratory stress (Gerin, Pieper, Levy, & Pickering, 1992; Kamark, Manuck, & Pickering, 1990; Lepore, Allen, & Evans, 1993). Gerin, Milner, Chawla, and Pickering (1995) tested these two models by measuring cardiovascular reactivity, with both high or low levels of stress and support or no support conditions within subjects. Social support reduced the diastolic blood pressures in both levels of stress, but this buffering effect was prominent in the high level of stress condition.

To summarize, hostility, task difficulty, and social support have been proved affecting CVR in response to experimental stressors. However,

previous studies have produced somewhat inconsistent findings because of ambiguous definitions of the concepts and inappropriate manipulations. Moreover, the possible interactions among them have not been fully investigated. The present study was designed to examine the possible interactions of these variables with a more clear definition of each construct. Specifically, we dealt with only the cynicism factor of MMPI Ho scale because it can be regarded as a primary component and relatively stable and unidimensional construct of hostility. We also examined the effect of hostility on CVR in a "provocative" situation, which is theoretically expected to activate the hostile person's cynical cognition on others, leading to exaggerated CVR. With regard to social support, we manipulated one of several components of the concept suggested by Silver and Wortman (1980): expression of agreement or acknowledgement. Second, we anticipated, according to a previous study (Lepore, 1995), that individuals with high hostility could not benefit from social support even if it is made available to them during stressful laboratory task. Third, we were to test the Main Effect Model and Stress-Buffering Model of social support by means of manipulating two levels of stress with task difficulty. Finally, we expected that high-difficulty tasks would induce more effortful attempts to control, or active coping, than low-difficulty tasks and lead to more heightened CVR.

METHOD

Subjects

Male college students (N=243) who were taking one of introductory psychology courses at

Chungnam National University participated in a pretesting session to complete MMPI Ho scale. One hundred twelve out of 243 potential subjects participated in the experiment. The mean age for the 112 participants was 21.4 ± 2.6 years.

Procedure

Pretesting Session

MMPI Ho scale (50 items) was administered to 243 male college students. We had participants rate each statements on a 4-point scale from 0 (completely false) to 3 (completely true). Of 50 items, only cynicism items (24 items) suggested by Costa, Zonderman, McCrane, and Williams (1986) were used. Two hundred and forty three participants were divided by median split (56) on the cynicism factor scores into a high-hostility group and a low-hostility group. Subjects were requested to neither smoke nor ingest any caffeine 1 hour before their laboratory testing sessions.

Laboratory Testing Session

Sixty subjects from each hostility group (high or low) were randomly assigned to one of support conditions (support vs. no support) and one of task difficulty (high vs. low) conditions. That is, a 2 (high vs. low hostility) \times 2 (high vs. low task difficulty) \times 2 (support vs. no support) completely randomized design was used to examine the main and interactive effects of hostility, task difficulty and social support on CVR. The number of subjects of each experimental condition was 14 (Six subjects were excluded because they were hypertensives or did not complete the experiment).

① Introduction to Experiment and the Measurement of Baseline CVR (12 minutes)

On arrival at the laboratory, a male experimenter explained the procedure and subjects completed a prequestionnaire which consisted of items measuring state anger and state anxiety. Ten state anger and 7 state anxiety items from the STAI (Spielberger, Gorsuch, & Lushene, 1970) and STAXI (Spielberger, 1988) were used. Subjects were told that "the purpose is to examine the change of blood pressure while performing mental arithmetic task." Then, they completed the prequestionnaire.

After the blood pressure cuff was attached to their arms, they were asked to relax for 10 minutes and the experimenter began to measure blood pressure (BP) and pulse rate (PR) every minute (total 10 times).

② Provocative Stress Period (10 minutes)

Following the baseline period, a male confederate was escorted into the laboratory. The experimenter introduced him as an undergraduate student. Subjects were also told that his role was to present the digits of number to them and check the speed and accuracy of the answers. The task consisted of eight 1-min trials. On each trial, subjects were asked to sum the two digits (low difficulty condition; e.g., 12, 13, 21, 22 etc.) or three digits (high difficulty condition; e.g., 237, 634, 387, 478 etc.) and add the resulting sum to the number itself, thereby obtaining a new two- or three-digit number. At the end of the 2nd, 3rd and 4th trials of the task, harassing statements were delivered. Harassment statements included: "You're so slow and inaccurate. This must not be your best"; "Try harder! try!"; and "(With a scornful smile) Stop! Are you now thinking of something else?"

As soon as the confederate delivered the 3rd harassing statement, the experimenter said the

following only in the support condition: "(to the confederate) What is wrong? I think he is doing very well! Will you just present the numbers. (contacting eyes with the subject) I understand this task is basically tiresome. But you have been working very hard! Take it easy! Please, go ahead." In the no support condition, the experimenter made no mention of the confederate's harassment. During the provocative stress period, the BP and PR were measured every minute (total 8 times).

③ Recovery Period (5 minutes)

Following the provocative stress period, subjects were asked to relax for 5 minutes as they were in the baseline period. During this period, the BP and PR were measured every minute (total 5 times).

④ Postquestionnaire Period (5 minutes)

After the recovery period, subjects were unhooked from the blood pressure cuff. Then, they completed a postquestionnaire which consisted of state anger and state anxiety items and manipulation check items for social support and task difficulty.

⑤ Debriefing

Subjects were then thoroughly debriefed. The purpose of the deception was explained and thanked for their participation. The complete procedure took about 34 minutes for each participant.

Dependent Measures and Data Reduction

As indices of CVR, systolic (SBP) and diastolic (DBP) blood pressures and pulse rate (PR) were

recorded from the subject's nondominant arm, using DynaPulse 5000AUTO system and DynaPulse 5000A software.

During the 10-min baseline period, 10 systolic, 10 diastolic blood pressures and 10 pulse rate readings were recorded; the last three of each were averaged and constituted the baseline level. During the provocative stress period and the recovery period, all readings (8 readings for the stress period; 5 readings for the recovery period) of each CVR index were averaged.

Each subject's averaged scores for the baseline, the provocative stress and the recovery periods were then converted into "change" scores by subtracting from them their respective previous levels. Since these change scores could be influenced by initial levels of values ("the law of initial values"; Wilder, 1968), correlations between initial scores and change scores were examined. Except for the correlations between baseline SBP and PR and stress-period change scores (all p 's > .10), all the correlations were statistically significant: the correlation between baseline DBP and stress-period change score was $-.34$ ($p < .001$); correlations between stress-period SBP, DBP and PR and recovery-period change scores were $-.63$, $-.50$ and $-.93$, respectively (all p 's < .001). Consequently, for all significant correlations, residualized change scores were computed and used as dependent measures.

RESULTS

Manipulation Check

Subjects rated the difficulty of the task on 5-point scale (2 items). A $2 \times 2 \times 2$ (hostility \times task

difficulty \times social support) ANOVA revealed the only significant main effect of task difficulty, $F(1, 104) = 4.76$, $p < .05$. Subjects assigned to high difficulty condition rated the task as more difficult (5.23 ± 2.19 vs. 4.34 ± 2.12).

Subjects also rated on a 9-point scale (4 items) how much the experimenter was supportive, cooperative and empathic during performing the arithmetic task. A $2 \times 2 \times 2$ ANOVA revealed the only significant main effect of social support, $F(1, 104) = 56.27$, $p < .001$. Subjects assigned to the support condition assessed the experimenter as more supportive (27.54 ± 4.56 vs. 19.30 ± 4.75).

CVR during the Provocative Stress Period

There were no significant differences among experimental groups in the baseline SBP, DBP and PR readings. During provocative stress period, a series of $2 \times 2 \times 2$ (high/low hostility \times high/low task difficulty \times support/no support) ANOVA on SBP, DBP and PR change scores (residualized change score in case of DBP) were conducted. No main effects were significant. But several 2-way interaction effects were significant: First, there were statistically significant interactions of hostility and social support on SBP, $F(1, 104) = 7.66$, $p < .01$, and DBP, $F(1, 104) = 7.40$, $p < .01$. Second, the interaction of task difficulty and social support was significant on SBP, $F(1, 104) = 3.94$, $p < .01$. Finally, the interaction of hostility and task difficulty was marginally significant, $F(1, 104) = 2.93$, $p < .10$, on DBP. The results of simple main effects tests for significant interactions were as follows:

① Interaction of hostility and Social Support

For low-hostility subjects, supported individuals had smaller increase in DBP, $F(1, 104) = 4.47$, $p < .05$,

than nonsupported individuals. In contrast, for high-hostility subjects, supported individuals showed rather larger increase in SBP, $F(1, 104)=4.90$, $p<.05$, than did nonsupported individuals (Figure 1 and Figure 2). Interestingly, although there was no difference between high-hostility and low-hostility groups in the support condition, low-hostility compared with high-hostility subjects showed larger increase in SBP, $F(1, 104)=8.55$, $p<.01$, and DBP, $F(1, 104)=7.95$, $p<.01$, in the no support condition.

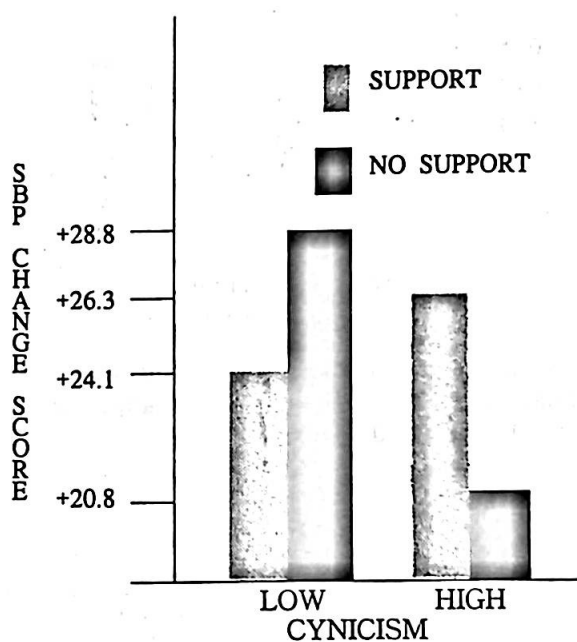


Fig 1. Interactive effect of cynicism and social support on SBP change score during stress period.

② Interaction of Task Difficulty and Social Support.

In the no support condition, subjects in the high-difficulty condition showed significantly larger increase in SBP than subjects in the low-difficulty condition, $F(1, 104)=4.72$, $p<.05$. However, there was no difference in terms of CVR (SBP, DBP, and PR) across two difficulty conditions once supported during the stress period (Figure 3).

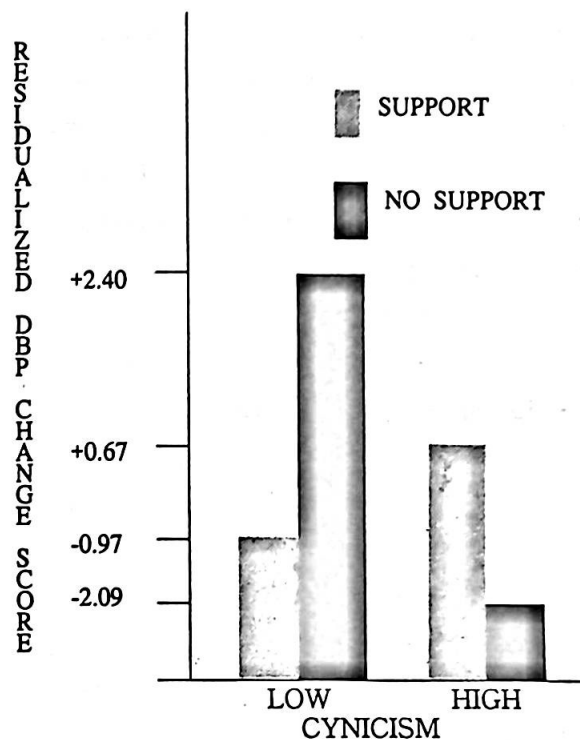


Fig 2. Interactive effect of cynicism and social support on DBP residualized change score during stress period

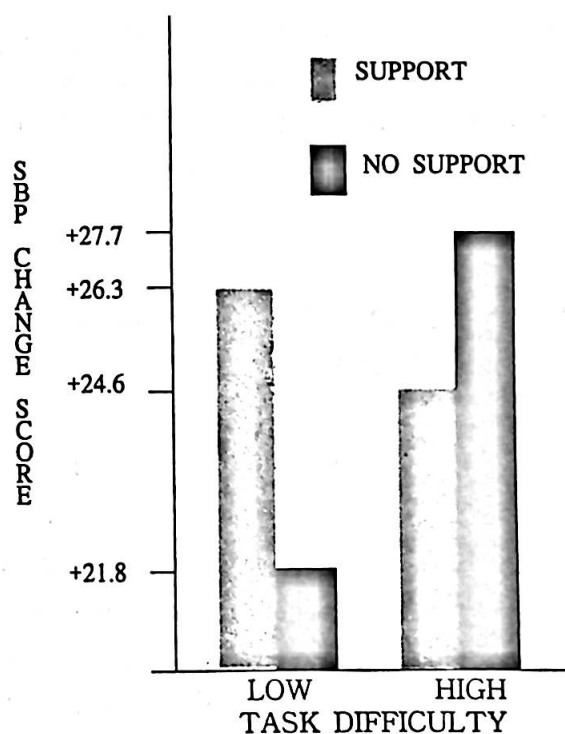


Fig 3. Interactive effect of task difficulty and social support on SBP change score during stress period

③ Interaction of Hostility and Task Difficulty.

In the high-difficulty condition, low-hostility subjects showed a significantly larger increase in DBP than high-hostility subjects, $F(1, 104)=4.44$, $p<.05$. But there was no difference between high- and low-hostility groups in the low-difficulty condition (Figure 4).

CVR during Recovery Period

The main effect of social support on SBP was significant, $F(1, 104)=4.27$, $p<.05$. That is, supported subjects ($M=-1.16$) recovered more quickly than nonsupported subjects ($M=1.16$), regardless of levels of hostility and task difficulty.

There were no significant effects on DBP during the recovery period. The interaction of task difficulty and social support on PR was significant, $F(1, 104)=4.65$, $p<.05$. For nonsupported individuals, subjects in the high-difficulty condition recovered more slowly in PR than subjects in the low-difficulty condition, $F(1, 104)=8.30$, $p<.01$. But there was no difference among supported subjects (Figure 5).

State Anxiety and State Anger Before and After Experimental Manipulation.

We conducted a series of $2 \times 2 \times 2$ (High/low hostility \times high/low task difficulty \times support/no support) ANOVA's to test the differences among experimental groups in state anger and anxiety before and after experiment. There were significant main effects of hostility on preanger, $F(1, 104)=4.33$, $p<.05$, and preanxiety, $F(1, 104)=10.38$, $p<.01$. That is, high-hostility subjects reported more anxiety and anger before their participation in the experimental procedure. But, controlling for

preanger and preanxiety, there was no significant difference across groups on postanger and postanxiety.

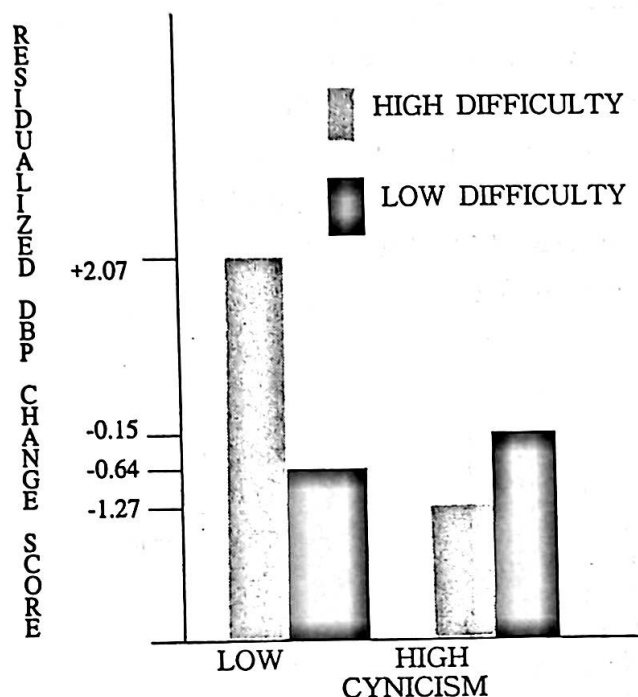


Fig 4. Interactive effect of cynicism and task difficulty on residualized DBP change score during stress period

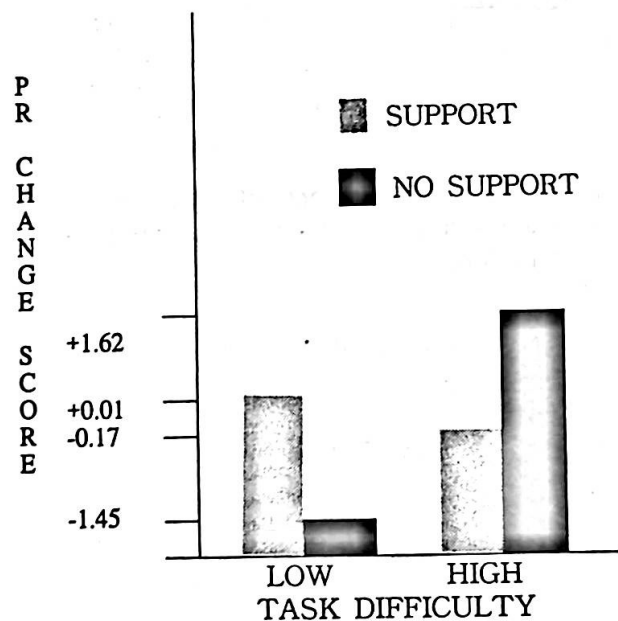


Fig 5. Interactive effect of task difficulty and social support on PR residualized change score during recovery period

DISCUSSION

The main purpose of this study was to investigate the interaction of hostility, task difficulty and social support on CVR. The only significant main effect in this study was the effect of social support on SBP during the recovery period; supported subjects consistently recovered more quickly. This result is consistent with previous studies, which demonstrated the benefit of social support during a stress period (Gerin, Pieper, Levy, & Pickering, 1992; Kamark, Manuck, & Jennings, 1990; Lepore, Allen, & Evans, 1993). It also suggests that social support can have a beneficial cardiovascular influence through a recovery process as well as during the stress period. However, more importantly, the pattern of the effect of social support was moderated by hostility. While social support reduced the DBP reactivity to provocative experimental stress for low-hostility individuals, which is consistent with a previous study (Lepore, 1995), it rather increased SBP for high-hostility individuals.

Unexpectedly, in the no support condition, high-hostility participants showed smaller increase in SBP than low-hostility men, which is contradictory to the most previous studies. We believe that this intriguing result could be best explained by a possible moderator; the difference between high- and low-hostility groups in the "commitment level". We observed, throughout the experiment, high-hostility men's uncommitted attitude to the experimental task. It is important to remember that there was no incentive (e.g., credit, money, etc) for good performance. While doing the task, some of high-hostility men made such comments as "This task is too difficult for me", "Should I do this boring task?" or "It is hard to

concentrate on this task." Actually a few subjects, who are all high-hostility men, gave up the task, saying "I can't do it anymore!" There is also a possibility, once social support was delivered to them, that they became more committed themselves to the task (Remember that the experimenter said to subjects in the support condition like "You are now doing well!"). It is highly likely that this pattern of behaviors of high-hostility men leads to a greater SBP increase in the support condition and smaller SBP and DBP increases in the no support condition.

In contrast, low-hostility men are likely to have fully committed themselves to the task whether or not they receive support from the experimenter. Once they receive support, they could perform the task with relief, in turn, resulting in lowered CVR. We have an additional evidence for this explanation; in the high-difficulty condition (undoubtedly, requiring more commitment), low-hostility individuals showed more heightened DBP than high-hostility men, while there was no difference between two groups in the low-difficulty (requiring less commitment) condition.

This interpretation, however, has limitations because we did not checked each individual's response rate and accuracy. But considering a study conducted in our laboratory (Ahn & Kim, 1996), which showed the more committed, the more heightened in SBP, the above explanation is very reasonable. Similarly, Houston (1986) suggested that hostile subjects may adopt an oppositional attitude toward the experiment or the experimenter and, as a result, may display less reactivity than is observed in involving situations. More research should be conducted to explore this behavior pattern of cynical men's: "voluntary low commitment".

By means of looking at the interaction of task difficulty and social support, we tested two models (Cohen & Syme, 1985) on "how social support works?". As mentioned earlier, in the recovery period, supported subjects recovered more quickly in SBP than nonsupported subjects. This result is interpreted as supporting the Main Effect Model of social support. But, in the stress period, interactive effect was also significant; while the high-difficulty group showed more exaggerated SBP during the stress period and its PR recovered more slowly in the no support condition, this between-group difference disappeared in the supported condition. Therefore, the Stress-Buffering Model was also supported. This result is consistent with a previous finding (Gerin, Milner, Chawla & Pickering, 1995).

The interaction of hostility and task difficulty was also significant. We assumed that the high-difficulty task would induce more effortful attempts to control, or active coping, than the low-difficulty task and lead to more exaggerated CVR. But this assumption appears to be valid only in the low-hostility group; high-hostility individuals seems to lower their commitment level voluntarily as we discussed above. Accordingly, if one intends to examine the interaction of active coping and hostility in future studies, other manipulation methods would be more appropriate. For example, Kim (1995) and Ahn & Kim (1996) used reward (i.e., credit) to induce high commitment or active coping.

Our study has many implications and limitations. First, this study provides an experimental evidence of the potential cardiovascular benefit of social support. More importantly, it suggests that the role of social support be moderated by cynical attitude toward

others. This interaction pattern should be further examined and replicated in a variety of interpersonal situations for generalization to real life.

Second, two models of social support (Cohen & Syme, 1985) were all supported in our study. More research, however, is required to reach a general conclusion since the present results are based on a relatively small number of male college students. Also, in relation to external validity, it should be noted that there may be a considerable difference between stress manipulated in an experimental situation in our study and real-life stress we encounter in our daily lives.

Third, our study suggests that high-hostility people do not always show more heightened CVR in response to provocative laboratory stress. Since this result is inconsistent with most previous studies, future research is needed to clarify this inconsistency. We suggest that commitment is one of the possible explanations for this unexpected result. Given recent studies on personality and biological variables, it is also likely that these variables moderate the effect of hostility on CVR. For instance, Shapiro, Goldstein, & Jamner (1995) found that the greatest heart rate response to the math task under harassment was shown in high-defensiveness/low-hostility men and high level of hostility did not by itself predict increased heart rate reactivity. Accordingly, in future research, our knowledge on the relation between hostility and CVR could be greatly improved by investigating possible moderators, such as commitment and defensiveness.

Fourth, this study also suggests that situational variables are also important factors to which experimenters should pay attention. In our study, CVR appeared to be the function of the

combination of task itself, interpersonal stress, emotional responses (such as, anger and anxiety) as well as independent variables. This possibility limits the clarity of interpretation on the results. Therefore, in future studies, a more simple but interpersonally stressful, as opposed to task-oriented, situation would be desirable to examine the effects of hostility on CVR for theoretical clarity as well as external validity.

Finally, longitudinal studies relating CVR to CVD are needed for the practical applications of this kind of research to cardiovascular health problems. Although cardiovascular reactivity is now regarded as one of the possible mechanisms through which CVD can develop, the long-term effects of exaggerated CVR on CVD are not clearly evidenced. If CVR is a truly valid mediator in the relation of hostility and CVD, research findings on the contributing factors to exaggerated CVR could provide more critical implications for etiology and psychological interventions (e.g., relaxation training). We believe that since we are living in a competition-oriented society, many people are susceptible to the development of cynical or hostile cognition on others, which in turn will result in the lowered benefit of social and emotional ties. Given this point, more studies about hostile people and the development of efficient psychosocial prevention and intervention strategies would significantly contribute to the improvement of the quality of life in the new millenium.

REFERENCES

- Ahn, D. Y., & Kim, K. H. (1996). Effects of hostility and commitment to the task on anger and blood pressure. *Korean Journal of Health Psychology, 1*, 140-150.
- Barefoot, J. C. (1992). Developments in the measurement of hostility. In H. S. Friedman (Ed.), *Hostility, coping, and health*. Washington D.C.: American Psychological Association.
- Barefoot, J. C., & Lipkus, I. M. (1994). The assessment of anger and hostility. In A. Siegman, & T. W. Smith (Eds.), *Anger, hostility, and the heart*. Hillsdale, NJ: Lawrence Erlbaum.
- Barefoot, J. C., Dodge, K. A., Peterson, B. L., Haney, T. L., & Williams, R. B. (1989). The Cook-Medley hostility scale: Item content and ability to predict survival. *Psychosomatic Medicine, 51*, 46-57.
- Beere, P. A., Glagov, S., & Zarins, C. K. (1984). Retarding effect of lowered heart rate on coronary atherosclerosis. *Science, 226*, 180-182.
- Cohen, S., & Syme, S. L. (1985). *Social support and health*. San Francisco: Academic Press.
- Cook, W. W., & Medley, D. M. (1954). Proposed hostility and pharisaic virtue scales for the MMPI. *Journal of Applied Psychology, 38*, 414-418.
- Costa, P. T., Zonderman, A. B., McCrae, R. R., & Williams, R. B. (1986). Cynicism and paranoid alienation in the Cook and Medley hostility scale. *Psychosomatic Medicine, 48*, 283-285.
- Dembroski, T. M., & MacDougall, J. M., Costa, P. T., Jr., & Granditis, G. A. (1989). Components of hostility as predictors of sudden death and myocardial infraction in the Multiple Risk Factor Intervention Trial. *Psychosomatic Medicine, 51*, 514-522.
- Friedman, M., & Rosenman, R. H. (1974). *Type A behavior and your heart*. New York: Knopf.
- Gerin, W., Milner, D., Chawla, S., & Pickering, T. G. (1995). Social support as a moderator of

- cardiovascular reactivity in women: A test of the direct effects and buffering hypotheses. *Psychosomatic Medicine*, 57, 16-22.
- Greenglass, E. R., & Julkunen, J. (1989). Construct validity and sex differences in Cook-Medley hostility. *Personality and Individual Differences*, 10, 209-218.
- Haynes, S. G., Feinleib, M., & Kannel, W. B. (1980). The relationship of psychosocial factors to coronary heart disease in the Framingham study: III. Eight-year incidence of coronary heart disease. *American Journal of Epidemiology*, 111, 37-58.
- Houston, B. K. (1986). Psychological variables and cardiovascular and neuroendocrine reactivity. In K. A. Matthews, S. M. Weiss, T. Detre, T. M. Dembroski, B. Falkner, S. B. Manuck, & R. B. Williams, Jr. (Eds.), *Handbook of stress, reactivity, and cardiovascular disease* (pp. 207-229). New York: Wiley.
- Houston, B. K. (1994). Anger, hostility, and psychophysiological reactivity. In A. Siegman, & T. W. Smith (Eds.), *Anger, hostility, and the heart*. Hillsdale, NJ: Lawrence Erlbaum.
- Kamarck, T. W., Manuck, S. B., & Jennings, J. R. (1990). Social support reduces cardiovascular reactivity to psychosocial challenge: A laboratory model. *Psychosomatic Medicine*, 52, 42-58.
- Kim, K. H. (1995). Effects of self-disclosure on physiological arousal, emotion, and self-understanding in anger-arousing stressful situation. *Korean Journal of Clinical Psychology*, 14(1), 237-252.
- Lepore, S. J. (1995). Cynicism, social support, and cardiovascular reactivity. *Health Psychology*, 1995, 14, 210-216.
- Light, K. C., & Obrist, P. A. (1983). Task difficulty, heart rate reactivity, and cardiovascular responses to an appetitive reaction time task. *Psychophysiology*, 20, 301-312.
- Manuck, S. B., Kaplan, J. R., & Clarkson, T. B. (1983). Behaviorally induced heart reactivity and atherosclerosis in cynomolgus monkeys. *Psychosomatic Medicine*, 45, 95-108.
- McCrane, E. W., Watkins, L., Brandsma, J., & Sisson, B. (1986). Hostility, coronary heart disease (CHD) incidence, and total mortality: Lack of association in a 25-year follow-up study of 478 physicians. *Journal of Behavioral Medicine*, 9, 119-125.
- Rosenman, R. H., Brand, R. J., Jenkins, C. D., Friedman, M., Strauss, R., & Wurm, M. (1975). Coronary heart disease in the Western Collaborative Group Study: Final followup experience of 8 1/2 years. *Journal of the American Medical Association*, 233, 872-877.
- Schekelle, R. B., Hulley, S., Neaton, J., Billings, J., Borhani, N., Gerace, T., Jacobs, D., Lasser, N., Mittlemark, M., & Stamler, J. (1985). MRFIT Research Group: The MRFIT behavior pattern study. II. Type A behavior pattern and incidence of coronary heart disease. *American Journal of Epidemiology*, 122, 559-570.
- Shapiro, D., Goldstein, I. B., & Jamner, L. D. (1995). Effects of anger/hostility, defensiveness, gender, and family history of hypertension on cardiovascular reactivity. *Psychophysiology*, 32, 425-235.
- Silver, R., & Wortman, C. (1980). Coping with undesirable life events. In J. Garber & M. E. P. Seigman (Eds.), *Human Helplessness*. New York: Academic Press.
- Smith, T. W. (1992). Hostility and health: Current status of a psychosomatic hypothesis. *Health*

Psychology, 11(3), 139-150.

- Smith, T. W., & Cristensen, A. J. (1992). Cardiovascular reactivity and interpersonal relations: psychosomatic processes in social context. *Journal of Social and Clinical Psychology*, 11, 279-301.
- Smith, T. W., & Frohm, K. D. (1985). What's so unhealthy about hostility? Construct validity and psychological correlates of the Cook and Medley HO scale. *Health Psychology*, 4, 503-520.
- Spielberger, C. D. (1988). *Manual for the State-Trait Anger Expression Inventory (STAXI)*. Odessa, FL: Psychological Assessment Resources.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. D. (1970). *STAI: Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C. D., Johnson, E. H., Russell, Crane, R. J., Jacobs, G. A., & Worden, T. J. (1985). The experience and expression of anger: Construction and validation an anger expression scale. In M. Chesney & R. Rosenman (Eds.), *Anger and Hostility in cardiovascular and behavioral disorders*. Washington D.C.: Hemisphere.
- Taylor, S. E. (1995). *Health Psychology*. New York: McGraw Hill.
- Wilder, J. F. (1968). *Stimulus and response: The raw of initial values*. Baltimore: Williams & Wilkins.
- Wright, R. A., Contrada, R. J., & Patane, M. J. (1986). Task difficulty, cardiovascular response, and the magnitude of goal valence. *Journal of Personality and Social Psychology*, 51, 837-843.

적대감, 사회적 지원 및 과제 난이도가 심혈관계 반응성에 미치는 효과

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본 연구에서는 도발적인 실험실 상황에서 적대감과 사회적 지원이 심혈관계 반응성에 미치는 상호작용 효과와 사회적 지원의 효과에 관한 주 효과와 완충 효과 모형을 과제 난이도를 조작해서 검증해 보았다. 120명의 남자대학생들이 실험 전에 실시한 MMPI Ho 척도의 냉소주의(Cynicism) 점수에서의 높고 낮음에 따라 분류되었으며, 이들은 사회적 지원이 있거나 없는 조건 및 과제 난이도가 높거나 낮은 조건에 각각 무선배당 되었으며, 과제 수행 동안 실험협조자로부터 부당한 도발을 받아 분노가 유발되는 장면에 직면하게 되었다. Ambulatory 혈압기를 사용해서 피험자가 실험실에 도착하고 난 뒤 휴식을 취하고 측정한 기저선 국면, 도발 국면 및 회복 기간을 통해, 수축기(SBP)와 확장기 혈압(DBP) 및 맥박율(PR)을 1분 간격으로 측정하였다. 적대감이 낮고 사회적 지원을 받은 피험자들은 분노 스트레스가 유발되는 기간 동안 지원을 받지 못한 참여자들에 비해 DBP의 증가량이 유의하게 낮았다. 이에 반해, 적대감이 높은 사람은 사회적 지원에도 불구하고 SBP의 증가량이 유의하게 높았다. 적대감이 낮은 피험자들이 높은 피험자들에 비해 사회적 지원을 받지 못할 때 SBP와 DBP가 오히려 더 올라가는 기대치 않던 결과도 얻어졌다. 높은 난이도의 과제를 배당 받은 사회적 지원을 받지 못한 피험자들은, 난이도가 낮은 과제를 배당 받은 지원을 받지 못한 피험자들에 비해, 분노 스트레스 유발 기간 동안 SBP와 PR에서 더 높은 증가량을 보였다. 이에 반해, 사회적 지원을 받는 경우에는 과제 난이도의 차이에 따른 SBP와 DBP 및 PR 증가량의 차이는 없었다. 회복기 동안에는 사회적 지원을 받은 피험자들이 그렇지 못한 피험자들에 비해, 적대감 수준이나 배당 받은 과제의 난이도와 관계없이, SBP의 회복 정도가 컸다. 본 연구의 결과는 사회적 지원이 적대적 태도에 의해 매개되어 심혈관계 반응성을 감소시켜줄 수 있음을 입증해 준다. 아울러, 사회적 지원의 주 효과와 완충 효과 모형이 모두 지지 받고 있음을 보여준다. 끝으로, 평소 적대감 수준이 높은 사람들이 실험실에서 유발된 분노 스트레스에 언제나 높은 심혈관계 반응성을 보이지는 않는다는 점을 시사하며, 이 과정에는 적대감이 높은 사람들의 낮은 실험상황에 대해 깊이 관여하지 않으려는 방어적 태도가 관계되어 있을 가능성이 있다고 논의했다.