Research report

The role of altruistic behavior in generalized anxiety disorder and major depression among adults in the United States

Takeo Fujiwara *

Harvard School of Public Health, United States
National Center for Child Health and Development, Japan

Abstract

Background: Although previous studies found protective associations of altruistic behaviors (AB) with positive mental health outcomes, these studies were limited to unspecified mental health outcomes and non-nationally representative studies. It is needed to examine the association of AB with generalized anxiety disorder (GAD) and major depression (MD).
Methods: Data collected from the National Survey of Midlife Development in the United States (MIDUS) in 1995–1996 for those aged between 25 and 74, who completed both the telephone survey and the self-administered questionnaire ($N = 4{,}242$) were analyzed. GAD and MD were measured by telephone on the basis of the Composite International Diagnostic Interview, while AB was measured by the questionnaire. Multivariate logistic regression was used to observe the independent effects of AB on GAD and MD.
Results: AB had a weak protective effect on GAD. However, AB had a significant and independent harmful effect on MD after controlling for demographic variables (gender, age, working status, and marital status).
Limitations: Since the MIDUS study is cross-sectional, the causality of the associations between AB with GAD and MD cannot be established. Other possible confounders that explain these associations were not controlled.
Conclusion: AB might be recommendable to prevent GAD, but on the other hand, it could be a risk factor for individuals having MD. Longitudinal studies are needed to explore the mechanism of the onset of GAD and MD through enhanced AB.
© 2006 Elsevier B.V. All rights reserved.

Keywords: Altruistic behavior; Generalized anxiety disorder; Major depression; Mental health; Positive psychology; Middle age

1. Introduction

Numerous studies suggest that positive behaviors, including altruism, may have health benefits for the individuals who exhibit them. Social interest, defined as "a cooperative approach toward life and a striving for ideal community", has been associated with physical health and considered as a moderator of life stress (Crandall, 1978). Altruism is defined as the "degree of obligation felt in situations involving helping others at expense" (Rossi, 2004). It was highly correlated with family obligations (correlation coefficient (cc): 0.46), civic obligations (cc: 0.45), and contribution made to others (cc: 0.33) (Rossi, 2004). Schwartz and Sendor (1999) have shown that altruistic patients experience better quality-of-life. In addition, Schwartz et al. (2003) found a positive and significant association between altruistic behaviors (AB) and improved mental health. Further, the second study determined that providing help

* Department of Psychosocial Medicine, National Center for Child Health and Development, 2-10-1 Okura, Setagaya-ku, Tokyo, 157-8535, Japan. Tel.: +81 3 3416 0181; fax: +81 3 3416 2222.
E-mail address: tfujiwar@post.harvard.edu.

is a more important predictor of mental health outcomes than receiving it, suggesting that AB may more effectively protect against mental health disorders than social support.

AB could be considered to promote positive emotion. According to positive psychology, defined as the "scientific study of ordinary human strengths and virtues" (Sheldon and King, 2001), positive emotion is associated with mental and physical health (Salovey et al., 2000; Seligman and Csikszentmihalyi, 2000; Taylor et al., 2000), possibly through optimism (Peterson, 2000), happiness (Myers, 2000), and self-determination (Ryan and Deci, 2000). Therefore, it is hypothesized that AB may prevent the onset of mental disorders such as anxiety disorder or depression.

However, previous studies were limited to a non-representative sample and used a self-rated mental health measure (Schwartz et al., 2003). To the best of author's knowledge, no study has thus far investigated the association between AB and anxiety disorder and depression using a nationally representative sample and diagnostic criteria such as the Diagnostic and Statistical Manual (DSM).

It is proposed that the protective effect of altruism persists on mental health, specifically on generalized anxiety disorder (GAD) and major depression (MD) after adjusting for potential confounders.

2. Methods

2.1. Study sample

This study is a secondary analysis of data originally collected during the National Survey of Midlife Development in the United States (MIDUS) in 1995–1996: a collaborative, interdisciplinary investigation of the patterns, predictors, and consequences of mid-life development in the areas of physical health, psychological well-being, and social responsibility. Respondents were selected from a nationally representative random digit dial sample of noninstitutionalized, English-speaking adults, aged between 25 and 74 years, selected from working telephone banks in the coterminous United States. Detailed information regarding the MIDUS study is available in previous publications (Brim, 2000) and on the MIDMAC website (The John D. and Catherine T. MacArthur Foundation, 2006). This data sample includes 4242 MIDUS respondents who had completed both the telephone survey, which captured GAD and MD outcomes, and the self-administered questionnaire, which captured information related to AB and potential confounders.

2.2. Outcome measurement: GAD and MD

MIDUS researchers assessed GAD and MD using telephone responses to the screening versions of the WHO's "Composite International Diagnostic Interview" (CIDI), Version 10 (Kessler et al., 1998; Wittchen, 1994; World Health Organization, 1990). GAD and MD determinations were based on definitions and criteria specified in the DSM-III-R (American Psychiatric Association, 1987). The test–retest reliability and clinical validity of CIDI diagnoses have previously been examined (Blazer et al., 1994). Moreover, GAD and MD scales employed in the present study were used in a previous publication, where they were based upon the responses of the MIDUS dataset (Kessler et al., 1999).

2.3. Independent variable measurement: AB and confounders

AB is calculated as the sum of scored responses to four hypothetical questions (Rossi, 2004). The respondents rate the degree of obligation they would feel if asked to (1) pay more for their own health care so that everyone had access to health care, (2) volunteer time or money for the social causes that they support, (3) collect contributions for heart or cancer research if asked to do so, and (4) vote for a law to help others who are less privileged than them knowing that the introduction of such a law would increase their taxes. Responses to each question were scaled from 0 to 10, with 10 denoting the highest degree of AB, for a maximum score of 40. This scale has good reliability (alpha=0.80) and considerably good variation in scale range (Mean=23.4, Standard Deviation=8.9) (Rossi, 2004). Response scores were divided into quartiles for further analysis.

Possible demographic confounders that might be related to altruism and GAD or MD include age, gender, race, education, working status, and marital status. The categories of each variable are presented in Table 1.

2.4. Statistical analysis

Sampling weights were applied to adjust for possible selection bias and differential non-response (see detailed weights method for MIDUS in other literature (Brim et al., 2003)). All the results discussed below comprise weighted data.

Before testing the hypothesis, the demographic characteristics of quartiled AB groups were analyzed by ordered logistic regression. The demographic characteristics of GAD and MD positive groups were analyzed by univariate logistic regression. To test the hypothesis, an

Table 1
Weighted distribution of demographic characteristics of quartiled groups by altruistic behaviors score (lowest–highest) and results of weighted bivariate ordered logistic regression among 4242 respondents from the MIDUS Survey in the U.S. (1995–1996)

Characteristics	Altruistic behavior				
	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	β
Gender					
Female	22.9	25.6	25.2	26.3	Reference
Male	33.1	23.9	23.2	19.8	−0.405**
Age (year)					
25–34	29.9	26.9	25.5	17.7	Reference
35–44	29.3	27.3	24.1	19.3	0.036
45–54	24.3	22.6	26.2	26.9	0.389**
55–64	22.8	24.2	23.3	29.7	0.459**
65–74	27.0	19.0	20.5	33.4	0.478**
Race					
White	29.3	26.2	23.6	20.9	Reference
Black	16.1	16.5	27.5	39.9	0.909**
Others	24.5	25.2	29.6	20.6	0.166
Education					
Some grade school to high school	26.9	29.3	18.5	25.3	Reference
GED or graduated high school	27.7	23.7	25.0	23.7	0.040
Some college (no bachelor degree)	29.0	26.2	22.1	22.7	−0.058
Graduated college or other professional degree	25.0	22.7	29.3	23.0	0.128
Working status					
Full-time working	27.8	26.5	24.9	20.8	Reference
Retired	26.2	19.4	25.3	29.1	0.298*
Homemaker	29.1	25.8	20.9	24.2	0.020
Unemployed	23.7	21.3	23.5	31.5	0.390*
Marital status					
Married	28.6	25.3	23.8	22.3	Reference
Separated	28.4	18.0	29.5	24.0	0.150
Divorced	24.9	28.0	23.7	23.3	0.093
Widowed	23.7	19.5	20.8	36.0	0.492*
Never married	23.2	22.7	28.1	26.0	0.272*

MIDUS: Midlife Development in the United States, Q1: lowest altruistic behavior score quartile, Q2: lower-intermediate altruistic behavior score quartile, Q3: higher-intermediate altruistic behavior score quartile, Q4: highest altruistic behavior score quartile, β: coefficient, GED: General Educational Development.
*$p < 0.05$, **$p < 0.01$.

unadjusted logistic regression and multiple logistic regression analyses were performed to test the independent effects of AB on GAD and MD, respectively, controlling for possible confounders which were associated with both AB and GAD or MD. The STATA SE statistical package, version 9, was used to manage the data and to perform the analysis. It is assumed that the association has an independent and significant effect if $p < 0.05$ and is weak if $p < 0.1$.

3. Results

The weighted characteristics of this study population of 4242 respondents were 57% female, slightly skewed to the younger side; 81% White and 14% Black; 86% were educated above the high school level; 66% were full-time workers; and 69% were married.

Table 1 describes the overall distribution of gender, age, race, education, working status, and marital status by AB quartiles. Statistically significant higher rates of AB were found in females than in males ($p < 0.01$), in those aged 45 or above than in those between 25 and 34 years ($p < 0.01$), in Blacks than in Whites ($p < 0.01$), in retired and the unemployed than in full-time workers ($p < 0.05$), and in widowed or unmarried than in married ($p < 0.05$). Education was not associated with AB.

Rates of GAD were significantly higher for women, in younger age groups, in those with a lower level of education, in the unemployed, and in the separated and divorced. Race was not associated with GAD. Similarly, rates of MD were significantly higher for women, in younger age groups, in those with a lower level of education, in the unemployed, and in the separated and divorced. Race was not associated with MD either.

Since education was not associated with AB, and race was not related to GAD and MD, education and race were excluded from further regression analysis.

As shown in Table 2, the weighted and unadjusted logistic regression used to investigate the effect of AB on GAD indicates that AB tended to have the protective effect on GAD, although it was not found to be statistically significant. In multiple logistic regression analysis that adjusted gender, age, working status, and marital status, a weak protective effect on the lower-intermediate AB group was observed ($p<0.1$). Table 3 shows the association between AB and MD. The unadjusted logistic regression showed that a significant positive trend was observed between AB and MD. The shift of one quartile to a higher AB quartile group increases the odds of MD by 14%. The association between AB and MD became stronger and increased to 16% when gender, age, working status, and marital status were adjusted. More specifically, the highest AB group was 1.59 times more likely to have MD than the lowest AB group (95% CI: 1.07–2.38).

4. Discussion

The results of this analysis showed a weak, independent, and protective effect of AB on GAD, and a significant, independent, and harmful effect of AB on MD. As hypothesized, a weak protective effect of AB on GAD was observed. However, contrary to the hypothesis, it is observed that those who exhibit altruism were more likely to have MD.

The limitations of this study provide abundant material for future research. First, as the MIDUS study is a cross-sectional study, the causality of the associations between AB with GAD and MD cannot be established. Second, there might be other confounders to explain the association between AB with GAD and MD. For example, an inborn selfish temperament might be associated with less AB and having GAD. Alternately, those raised by higher moral standards may tend to behave altruistically and therefore may tend to develop MD. Further research should measure possible inborn temperament confounders.

Table 2
Weighted distribution of quartiled altruistic behaviors in a positive sample of generalized anxiety disorder and results of weighted unadjusted and adjusted odds ratio among 4242 respondents from the MIDUS Survey in the U.S. (1995–1996)

Characteristics	Generalized anxiety disorder				
	%	Unadjusted OR	95% CI	Adjusted OR	95% CI
Altruistic behaviors					
Q1	4.06	Reference		Reference	
Q2	2.02	0.49	0.21–1.13	0.47[†]	0.21–1.08
Q3	2.76	0.67	0.33–1.37	0.64	0.31–1.31
Q4	2.70	0.66	0.32–1.35	0.61	0.27–1.38
Over all trend		0.88	0.68–1.14	0.86	0.66–1.14
Gender					
Female				Reference	
Male				0.44*	0.23–0.87
Age (year)					
25–34				Reference	
35–44				1.44	0.73–2.83
45–54				1.19	0.55–2.55
55–64				0.36	0.10–1.37
65–74				0.63	0.09–4.50
Working status					
Full-time working				Reference	
Retired				0.32	0.03–4.03
Homemaker				0.98	0.33–2.94
Unemployed				1.56	0.77–3.12
Marital status					
Married				Reference	
Separated				2.46[†]	0.88–6.91
Divorced				2.38*	1.19–4.75
Widowed				1.15	0.29–4.52
Never married				0.99	0.40–2.47

OR: odds ratio, CI: confidence interval, Q1: lowest altruistic behavior score quartile, Q2: lower-intermediate altruistic behavior score quartile, Q3: higher-intermediate altruistic behavior score quartile, Q4: highest altruistic behavior score quartile.
[†]$p<0.1$, *$p<0.05$, **$p<0.01$.

Table 3
Weighted distribution of quartiled altruistic behaviors in a positive sample of major depression and results of weighted unadjusted and adjusted odds ratio among 4242 respondents from the MIDUS Survey in the U.S. (1995–1996)

Characteristics	Major Depression				
	%	Unadjusted OR	95% CI	Adjusted OR	95% CI
Altruistic behaviors					
Q1	10.92	Reference		Reference	
Q2	13.12	1.23	0.85–1.79	1.22	0.84–1.79
Q3	14.35	1.37	0.95–1.97	1.35	0.93–1.96
Q4	15.67	1.51*	1.04–2.20	1.59*	1.07–2.38
Over all trend		1.14*	1.02–1.29	1.16*	1.02–1.32
Gender					
Female				Reference	
Male				0.63**	0.47–0.85
Age (year)					
25–34				Reference	
35–44				0.92	0.64–1.33
45–54				0.76	0.51–1.14
55–64				0.40**	0.24–0.66
65–74				0.26**	0.11–0.60
Working status					
Full-time working				Reference	
Retired				1.05	0.55–1.99
Homemaker				1.70*	1.04–2.75
Unemployed				1.46†	0.97–2.20
Marital Status					
Married				Reference	
Separated				1.99*	1.03–3.86
Divorced				2.00**	1.39–2.90
Widowed				1.93†	1.00–3.73
Never married				1.10	0.71–1.71

OR: odds ratio, CI: confidence interval, Q1: lowest altruistic behavior score quartile, Q2: lower-intermediate altruistic behavior score quartile, Q3: higher-intermediate altruistic behavior score quartile, Q4: highest altruistic behavior score quartile.
† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Despite these limitations, this study has several strengths. First, as the MIDUS study is a nationally representative sample, these findings may suggest an implication for a national health policy. Second, the large study sample provided strong statistical power to adjust for possible demographic confounders. Controlled confounders covered a wide range from gender, age, working status (as a substitute for socioeconomic status), and marital status (as a substitute for social network and stressful life events). Third, the MIDUS study used an established diagnostic scale of GAD and MD based on the DSM-III-R. Fourth, the MIDUS study covered adults at mid-life, aged between 25 and 74 years, a factor studied, as mental health research tends to focus more on children, adolescents, or the elderly. The impact of reducing GAD in these adults would be enormous, especially when one considers the absolute number of people with GAD, 4 million (U.S. Department of Health and Human Services, 1999), to be a substantial number.

The finding related to the protective effect of AB on GAD is consistent with previous studies, which used self-rated mental health questionnaires to decide the outcome (Schwartz et al., 2003). However, it is found that AB is a harmful factor for MD individuals at mid-life (25–74 years old) in the U.S. The mechanism, by which the differential effect of AB on GAD and MD, might be due to the effect of seeking higher standard of living. According to positive psychology, optimism may make people resilient to stress, especially current distress or anxiety (Peterson, 2000). It is known that physical or psychological stress is one of the etiologies of GAD (U.S. Department of Health and Human Services, 1999). This is why AB had a weak protective effect on GAD, as altruism is associated with resilience to stress (Brodkin and Coleman, 1996). However, optimism can be harmful for one's health if it is unrealistic (Peterson, 2000). This is because extremely optimistic, unrealistic people underestimate actual risks and become ill. Similarly, the higher AB group tended to

live according to unrealistic morals that are very different from a realistic life. As a result, this difference made people feel sad or powerless in relation to their own lives.

Evolutionary psychiatry provides an alternative interpretation of the results. This theory posits that the constituent traits of mental illness may have emerged for survival and adaptive roles in the evolutionary past of human beings (Akiskal and Akiskal, 2005). According to Akiskal (1998), GAD should probably be classified under trait anxiety, named "Generalized Anxiety Temperament (GAT)". It is also suggested that GAT seems to have a distinct profile with altruistic overtones, considered as "altruistic anxiety", subserving hypothetically the survival of one's extended phenotype in a "kin selection" paradigm. For example, anxiety was associated with the traits of worrying about one's kin, and was positively associated with harm avoidance temperament (Akiskal and Akiskal, 2005). In addition, generalized anxiety appears to predispose to and is often associated with depression (Akiskal, 1998).The findings of this study can be explained by this argument. Those who behave based on altruism were more likely to have depression because depressed and altruistic people shared the same social phenotype. However, this study did not show significant association between AB and GAD. As AB is defined as doing things to better society, and not specifically for a kin, this different focus of AB may help to explain the differences of the association between AB and GAD from the association between AB and MD.

Part of the effect of AB on depression could be due to the caregiving strains (van Wijngaarden et al., 2004). In their study, caring for a depressed spouse, which is considered to be similar to AB, caused distress in caregivers. Not only the difference in feeling gap but also taking care of others per se might have a direct impact on caregivers in the form of distress and may lead to depression.

Based on these findings, it might be recommended to promote AB in those who suffer from GAD or those who tend to be anxious. However, as AB might be risky for those with MD, such advice should be given carefully. There is no doubt that AB should not be recommended to those who suffer from MD as it may be harmful for them.

In conclusion, the high levels of AB have a weak protective effect on GAD, but a significant harmful effect on MD, in adults at mid-life in the U.S. Further, longitudinal studies are needed to explore the protective mechanism of AB for the onset of GAD and the development mechanism of MD through enhanced AB.

References

Akiskal, H.S., 1998. Toward a definition of generalized anxiety disorder as an anxious temperament type. Acta Psychiatr. Scand. 98 (Suppl. 393), 66–73.

Akiskal, K.K., Akiskal, H.S., 2005. The theoretical underpinnings of affective temperaments: implications for evolutionary foundations of bipolar disorder and human nature. J. Affect. Disord. 85, 231–239.

American Psychiatric Association, 1987. Diagnostic and Statistical Manual of Mental Disorders, third ed. American Psychiatric Association, Washington, DC.

Blazer, D.G., Kessler, R.C., McGonagle, K.A., Swartz, M.S., 1994. The prevalence and distribution of major depression in a national community sample: the National Comorbidity Survey. Am. J. Psychiatry 151, 979–986.

Brim, O.G., 2000. MacArthur Foundation study of successful midlife development. ICPSR Bull. 20, 1–5.

Brim, Orville G., P.B.B., Bumpass, Larry L., Cleary, Paul D., Featherman, David L., Hazzard, William R., Kessler, Ronald C., Lachman, Margie E., Markus, Hazel Rose, Marmot, Michael G., Rossi, Alice S., Ryff, Carol D., Shweder, Richard A., 2003. National Survey of Midlife Development in the United States (MIDUS), 1995–1996 Codebook for Part 1, Main Data Inter-university Consortium for Political and Social Research, Ann Arbor, Michigan.

Brodkin, A., Coleman, M., 1996. What makes a child resilient? Instructor 105, 28–29.

Crandall, J.E., 1978. The effect of stress on social interest and vice versa. J. Individ. Psychol. 34, 40–47.

Kessler, R.C., Andrews, A., Mroczek, D., Ustun, B., Wittchen, H.U., 1998. The World Health Organization Composite International Diagnostic Interview Short-Form (CIDI-SF). Int. J. Methods Psychiatr. Res. 7, 171–185.

Kessler, R.C., Mickelson, K.D., Williams, D.R., 1999. The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. J. Health Soc. Behav. 40, 208–230.

Myers, D.G., 2000. The funds, friends, and faith of happy people. Am. Psychol. 55, 56–67.

Peterson, C., 2000. The future of optimism. Am. Psychol. 55, 44–55.

Rossi, A.S., 2004. Social responsibility to family and community. In: Brim, O.G., Ryff, C.D., Kessler, R.C. (Eds.), How Healthy Are We? A National Study of Well-being at Midlife. University of Chicago Press, Chicago, pp. 550–585.

Ryan, R.M., Deci, E.L., 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. Am. Psychol. 55, 68–78.

Salovey, P., Rothman, A.J., Detweiler, J.B., Steward, W.T., 2000. Emotional states and physical health. Am. Psychol. 55, 110–121.

Schwartz, C.E., Sendor, M., 1999. Helping others helps oneself: response shift effects in peer support. Soc. Sci. Med. 48, 1563–1575.

Schwartz, C., Meisenhelder, J.B., Ma, Y., Reed, G., 2003. Altruistic social interest behaviors are associated with better mental health. Psychosom. Med. 65, 778–785.

Seligman, M.E., Csikszentmihalyi, M., 2000. Positive psychology. An introduction. Am. Psychol. 55, 5–14.

Sheldon, K.M., King, L., 2001. Why positive psychology is necessary. Am. Psychol. 56, 216–217.

Taylor, S.E., Kemeny, M.E., Reed, G.M., Bower, J.E., Gruenewald, T.L., 2000. Psychological resources, positive illusions, and health. Am. Psychol. 55, 99–109.

The John D. and Catherine T. MacArthur Foundation, 2006. MIDMAC.

U.S. Department of Health and Human Services, 1999. Chapter 4: adults and mental health, Mental Health: A Report of Surgeon General. U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health, Rockville, MD, pp. 225–329.

van Wijngaarden, B., Schene, A.H., Koeter, M.W., 2004. Family caregiving in depression: impact on caregivers' daily life, distress, and help seeking. J. Affect. Disord. 81, 211–222.

Wittchen, H.U., 1994. Reliability and validity studies of the WHO Composite International Diagnostic Interview (CIDI): a critical review. Psychiatr. Res. 28, 57–84.

World Health Organization, 1990. Composite International Diagnostic Interview, CIDI, Version 10. World Health Organization, Geneva.