

Fletcher, Jason M.

Working Paper

Crushing Hope: Short Term Responses to Tragedy Vary by Hopefulness

IZA Discussion Papers, No. 11291

Provided in Cooperation with:

IZA – Institute of Labor Economics

Suggested Citation: Fletcher, Jason M. (2018) : Crushing Hope: Short Term Responses to Tragedy Vary by Hopefulness, IZA Discussion Papers, No. 11291, Institute of Labor Economics (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/177095>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

DISCUSSION PAPER SERIES

IZA DP No. 11291

**Crushing Hope: Short Term Responses to
Tragedy Vary by Hopefulness**

Jason Fletcher

JANUARY 2018

DISCUSSION PAPER SERIES

IZA DP No. 11291

Crushing Hope: Short Term Responses to Tragedy Vary by Hopefulness

Jason Fletcher

University of Wisconsin-Madison and IZA

JANUARY 2018

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Crushing Hope: Short Term Responses to Tragedy Vary by Hopefulness¹

This research note explores the consequences of dispositional optimism and hopefulness when the environment changes. Much literature has documented the importance of a positive outlook in pursuing investments in health and education that pay off in the future. A question that has received less attention is whether a positive outlook creates resilience in the face of setbacks or whether a positive outlook may be a disadvantage in extreme circumstances, especially when there is a large mismatch between expectations and reality. This paper uses the coincidental interview schedule of the Add Health data (N=15,024) around the terrorist attack of September 11, 2001 to examine interactions with this environmental shock and previously elicited measures of hopefulness. The results suggest that increases in depressive symptoms following the attack are concentrated among those young adults who initially expressed the most hopefulness in the future as teenagers.

JEL Classification: D91, I12

Keywords: evolutionary psychology, hopefulness, mismatch, depressive symptoms, trauma

Corresponding author:

Jason Fletcher
University of Wisconsin-Madison
La Follette School of Public Affairs
Department of Sociology
1180 Observatory Drive
Madison WI 53706
USA
E-mail: jason.fletcher@wisc.edu

¹ This project was made possible through the support of a grant from the John Templeton Foundation. The opinions expressed in this publication are those of the author and do not necessarily reflect the views of the John Templeton Foundation. This research was also supported by National Institute on Aging grant R01 AG0123456, and by core grants to the Center for Demography and Ecology at the University of Wisconsin-Madison (P2C HD047873) and to the Center for Demography of Health and Aging at the University of Wisconsin-Madison (P30 AG017266). The author thanks Jinho Kim and members of the Wisconsin Policy Analysis Lab for helpful comments.

Introduction

Large literatures across the psychological and social sciences have focused on understanding social and psychological processes underlying resilience to stressful and traumatic events, where resiliency is conceptualized in the literature as "the human capacity to face, overcome, and even be strengthened by the adversities of life" (Grotberg 1995). A key hypothesized determinant of resilience is expectations about the future. In particular, people who are measured to have high dispositional optimism, typically report lower distress after encountering a broad range of stressful situations (Andersson 1996; see Nes and Segerstrom 2006 for review and meta analyses). A primary hypothesized mechanism is the set of coping strategies employed by individuals with higher dispositional optimism, where approach coping strategies that aim to eliminate and manage stressors are used rather than avoidance coping strategies that ignore, avoid, or withdraw from stressors.

An alternative set of findings have suggested that traits like dispositional optimism and their associated coping strategies are not good or bad predictors of resilience, *per se*, but rather the key determinant of resilience is whether individuals and their experiences and traits are matched or mismatched with the environmental stressors that they face (Nederhof et al. 2014). This latter theory, and associated evidence, builds off theories in evolutionary and developmental psychology suggesting that individuals' early environments "program" them in ways that will be beneficial in their expected environments as adults (Boyce and Ellis 2005, Frankenhuis and Del Giudice 2012, Brody et al. 2013). In cases where the child and adult environments differ, adults can become mismatched with their environments. In particular, adults who develop dispositional optimism as children and adolescents due to living in a safe

and secure early environment may be less able to cope with adult trauma than adults who developed lower levels of optimism.

In the present study, I tested the hypothesis that dispositional optimism in contexts of trauma lead to higher resilience to the formation of depressive symptoms. The alternative hypothesis is that individuals with high dispositional optimism will be less likely to cope with trauma due to a mismatch between their coping strategy and the level of stress in the environment and will therefore experience higher levels of depressive symptoms following a traumatic event. I test this hypothesis using a prospective, nationally representative sample using a “natural experiment” framework to support causal inference.

Method

Sample

Data came from the first and third waves of the National Longitudinal Study of Adolescent to Adult Health (Add Health) (Harris et al. 2009). Add Health is a prospective nationally representative sample of US students in grades 7-12 in 1994/5 who have been followed through 2008/9 in four waves of surveys to understand life course processes of health and socioeconomic attainment. Of the 20,745 respondents in Wave 1, 20,662 have a non-missing report for dispositional optimism, 15,123 were followed in the Wave 3 data collection, and 15,024 of those followed have outcome information available, which is the analysis sample.

Measures

Baseline emotions style. The first wave of the survey collected rich sociodemographic, health, and schooling information including a Center for Epidemiology Studies Depression (CES-D) screener (Garrison et al. 1991) that contained the question of whether the respondent “felt hopeful about the future” during the past week. Answer options include (never/rarely, sometimes, a lot of the time, and most/all of the time). This question is used to assign “hopefulness” or dispositional optimism (or, more generally, positive emotions (Fredrickson et al. 2003)) at baseline. Other researchers have used Add Health data and questions about early mortality expectations as a measure of hope and found associations with financial and social capital (Bennett et al. 2014).

Exposure to a traumatic event. The Wave 3 data collection occurred over 2001-2002 and coincidentally overlapped with the terrorist attacks on the United States on September 11, 2001. We use the date of the Wave 3 interview as our indicator of exposure to a traumatic event. Ford et al. (2003) and Fletcher (2014) used these data to show that being interviewed following the attacks resulted in elevated depressive symptoms compared to those interviewed prior to the attacks.

Depressive symptoms. A shortened, 9-item, CES-D screener was used at Wave 3. Each item was based on a question of “How often was each of the following things true during the past seven days?” and had available responses of: never/rarely, sometimes, a lot of the time, and most/all

the time. The items included: you were bothered by things that usually don't bother you; you could not shake off the blues, even with help from your family and friends; you felt that you were just as good as other people (reverse coded); you had trouble keeping your mind on what you were doing; you were depressed; you were too tired to do things; you enjoyed life (reverse coded); you were sad; you felt that people disliked you. These items are summed to create a depression scale (0 points for never up to 3 points for most/all the time).

Statistical Analysis

To examine whether individuals' elevated depressive symptoms following the terrorist attack on September 11, 2001 was conditional on baseline dispositional optimism, I compared the depressive symptoms of individuals who were interviewed before vs. after the attack and estimated differences in elevated symptoms conditional on Wave 1 hopefulness. I performed linear regression analysis with controls for sociodemographic characteristics and day of the interview to adjust for seasonal differences in depressive symptoms (Tefft 2012). The key coefficient of interest was the interaction between baseline hopefulness and an indicator for being interviewed after 9/11. Additional analyses examine this interaction for each of the 9 items of the depression index separately. An important assumption of this analysis is that the "exposure" of being interviewed before vs. after 9/11 is uncorrelated with baseline hopefulness, which I test in supplemental tables (Table 5A). Additional supplemental files show that attrition at Wave 3 is not statistically related to hopefulness at baseline (Table 4A).

Results

Descriptive statistics of all variables used in the analysis are shown in Table 1. The average depression scale score at Wave 3 follow up is 4.64 (4.09 SD) in the sample. At baseline, 11% of the sample reported never/rarely feeling hopeful, 26% report sometimes, 34% report a lot, and 29% report most/always feeling hopeful. 78% of the sample were interviewed following the terrorist attack and are therefore the “treated” group. Sociodemographic and educational control variables include race/ethnicity, age, sex, family income during high school, maternal education level, the Peabody Picture Vocabulary Test (PVT), and indicator variables for missingness of these control variables. Appendix Table 1A stratifies the descriptive statistics based on Wave 1 hopefulness. Appendix Table 2A presents statistical associations between the sociodemographic controls and Wave 1 hopefulness using OLS regression analysis. Individuals with higher PVT scores and from more highly educated families have higher hopefulness. Black respondents (conditional on socioeconomic status) report higher hopefulness than whites; Hispanic and “other” race/ethnic groups report lower hopefulness than whites.

Table 2 presents the main results predicting depression symptoms at Wave 3. The post 9/11 indicator coefficient suggests that individuals interviewed following the terrorist attacks of 9/11 had depressive symptoms that were 0.436 points higher (approximately 0.1 standard deviations) than those interviewed before the attacks. Baseline hopefulness also predicts depressive symptoms; those who reported being hopeful “most/all” the time have a 1 point lower depressive symptom score than those who reported “never/rarely” being hopeful at baseline (which is approximately six years prior to the depressive reports). The results also

reproduce results from the literature, that racial/ethnic minorities report higher depressive symptoms, as do female respondents.

Column 2 of Table 2 focuses attention on the key coefficient of interest and shows an interaction between exposure to the traumatic experience and baseline hopefulness. Indeed, individuals with higher levels of baseline hopefulness are found to have an elevated response to the terror attacks compared to individuals with lower baseline hopefulness. Appendix Table 3A stratifies these analyses by baseline hopefulness, which further supports an elevated response to the terrorist attack for individuals with higher baseline hopefulness.

Table 3 further examines the elevated responsiveness to the terrorist attacks for individuals with higher baseline hopefulness by examining each of the 9 depressive symptoms, in separate analyses. Column 1 in Table 3 reproduces results from Table 2 for comparison. The results suggest no differences in four of the depressive symptoms, including being bothered by things, being distressed, being sad, and thinking that people dislike you. In contrast, individuals with high baseline hopefulness have elevated responses for symptoms such as feeling not as good, not enjoying life, feeling too tired, and not being able to shake off the blues.

Discussion

This study is among the first to show evidence of detrimental effects of mismatch between emotional style and the environmental context using a representative national sample and a severe stressor (the 9/11 terrorist attack in the US). Large literatures in the psychological and social sciences have shown a wide range of life course benefits for individuals who are

hopeful and optimistic about the future (Dougall et al. 2001). Indeed, hope and optimism have been claimed to “serve as a priceless asset in the face of adversity” (Bennett et al. 2014). A potential disadvantage of hopefulness may occur when the environmental context is highly stressful, which could lead to a mismatch between cognitive style and realistic outcomes. In cases of stressful or highly disadvantaged environments, individuals who are not overly optimistic may have an advantage in coping. Indeed, the evidence in this paper supports the mismatch hypothesis, that dispositional optimism is a valuable trait, in terms of lower depressive symptoms, when the environment is relatively stable, but that this trait may be ill adaptive in contexts of more severe trauma and uncertainty. The results conflict with some smaller studies in the literature. For example, Frederickson et al. (2003) interviewed fewer than fifty college students to show that positive emotions buffer against depression following the terrorist attacks of 9/11.

This evidence is consistent with results from both studies using human and animal models (Frankenhuis and Del Giudice 2012, Schmidt 2011). Nederhof et al. (2014) showed that adolescents who the authors label as “sustainers” in terms of their invariant attentional style across tasks performed poorly in changing environments compared with adolescents labeled as “shifters.” Likewise, many researchers have reported that rats who experienced elevated early life stress showed adaptations, such as lower levels of depressive-type symptoms, under stressful conditions (Champagne et al. 2008, Kiank et al. 2009).

A strength of the analysis is the ability to use a “natural experiment” approach to more clearly demonstrate causal effects. The key assumption in the research design is that the Wave 3 interview date, and therefore the timing of the exposure to the terrorist attack, is quasi-

randomly assigned, which allows individuals interviewed shortly before the attack to serve as appropriate counterfactuals to those interviewed shortly after the attack. Our results are consistent with the assumption, as hopefulness and other characteristics are unrelated to the interview date. Another strength of the analysis is the use of a measure of dispositional optimism collected over six years prior to the exposure and outcome measurement. To the extent this trait changes during the intervening years between assessment and outcome measurement, the expectation is that this measurement error would attenuate the results toward zero.

The evidence of the role of stress in depression is important in part because of its potential implications for both clinical practice as well as future research. An ongoing question implied by the results is: what contexts and for what levels of stress does the mismatch hypothesis apply? A tradeoff in the level of dispositional optimism appears to be that individuals with high dispositional optimism who were interviewed prior to the 9/11 terrorist attack had substantially lower levels of depressive symptoms than those with low optimism. This evidence is consistent with a broad literature showing the benefits of optimism across many life domains (Carver et al. 2010 for review). However, under circumstances of high stress, those with high dispositional optimism experienced more elevated negative reactions. This paper is unable to examine the dynamics of hopefulness post-trauma. Other work has suggested that the trajectories of optimism post-trauma are important predictors of resilience and also interact with other social factors, like social support availability (Dougall et al. 2001). There is also uncertainty about the ability for clinicians to shape traits related to optimism due to the strong genetic influence on these traits (Feder et al. 2009). Future research might direct

attention to assessing under which contexts and for what outcomes the mismatch hypothesis appears to dominate and whether strategies to shape optimism and/or shape strategies to avoid specific environmental exposures may be more fruitful.

References

Bennett, Ashley, M. P. H. David Wood MD, DrPH Ryan Butterfield MPH, and M. P. H. Jeff Goldhagen MD. "Finding hope in hopeless environments." *International Journal of Child Health and Human Development* 7, no. 3 (2014): 313

Boyce, W. T., & Ellis, B. J. (2005). Biological sensitivity to context: I. An evolutionary-developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology*, 17, 271–301. doi:10.1017/S0954579405050145

Brody, G. H., Yu, T., Chen, E., Miller, G. E., Kogan, S. M., & Beach, S. R. H. (2013). Is resilience only skin deep? Rural African Americans' socioeconomic status-related risk and competence in preadolescence and psychological adjustment and allostatic load at age 19. *Psychological Science*, 24, 1285–1293. doi:10.1177/0956797612471954

Carver, Charles S., Michael F. Scheier, and Suzanne C. Segerstrom. "Optimism." *Clinical psychology review* 30, no. 7 (2010): 879-889.

Dougall, Angela Liegey, Kelly B. Hyman, Michele C. Hayward, Sheila McFeeley, and Andrew Baum. "Optimism and Traumatic Stress: The Importance of Social Support and Coping1." *Journal of Applied Social Psychology* 31, no. 2 (2001): 223-245.

Feder, Adriana, Eric J. Nestler, and Dennis S. Charney. "Psychobiology and molecular genetics of resilience." *Nature Reviews Neuroscience* 10, no. 6 (2009): 446-457.

Fletcher, Jason M. "Enhancing the gene-environment interaction framework through a quasi-experimental research design: evidence from differential responses to September 11." *Biodemography and social biology* 60, no. 1 (2014): 1-20.

Ford, Carol A., J. Richard Udry, Karin Gleiter, and Kim Chantala. "Reactions of young adults to September 11, 2001." *Archives of Pediatrics & Adolescent Medicine* 157, no. 6 (2003): 572-578.

Frankenhuis, Willem E., and Marco Del Giudice. "When do adaptive developmental mechanisms yield maladaptive outcomes?." *Developmental psychology* 48, no. 3 (2012): 628.

Fredrickson, Barbara L., Michele M. Tugade, Christian E. Waugh, and Gregory R. Larkin. "What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001." *Journal of personality and social psychology* 84, no. 2 (2003): 365.

Garrison, Carol Z., Cheryl L. Addy, Kirby L. Jackson, Robert E. McKeown, and Jennifer L. Waller. "The CES-D as a screen for depression and other psychiatric disorders in adolescents." *Journal of the American Academy of Child & Adolescent Psychiatry* 30, no. 4 (1991): 636-641.

Grotberg, Edith H. "The International Resilience Project: Promoting Resilience in Children."
(1995).

Harris, K.M., C.T. Halpern, E. Whitset, J. Hussey, J. Tabor, P. Entzel, and J.R. Udry. 2009. The
National Longitudinal Study of Adolescent to Adult Health: Research Design [WWW document].
URL: <http://www.cpc.unc.edu/projects/addhealth/design>

Nederhof, Esther, Johan Ormel, and Albertine J. Oldehinkel. "Mismatch or cumulative stress the
pathway to depression is conditional on attention style." *Psychological Science* 25, no. 3 (2014):
684-692.

Nes, Lise Solberg, and Suzanne C. Segerstrom. "Dispositional optimism and coping: A meta-
analytic review." *Personality and social psychology review* 10, no. 3 (2006): 235-251.

Sandman, C. A., Davis, E. P., & Glynn, L. M. (2012). Prescient human fetuses thrive.
Psychological Science, 23, 93–100.

Schmidt, M. V. (2011). Animal models for depression and the mismatch hypothesis of disease.
Psychoneuroendocrinology, 36, 330–338.

Schuster, Mark A., Bradley D. Stein, Lisa H. Jaycox, Rebecca L. Collins, Grant N. Marshall, Marc
N. Elliott, Annie J. Zhou, David E. Kanouse, Janina L. Morrison, and Sandra H. Berry. "A national

survey of stress reactions after the September 11, 2001, terrorist attacks." *New England Journal of Medicine* 345, no. 20 (2001): 1507-1512.

Tefft, Nathan. "Mental health and employment: the SAD story." *Economics & Human Biology* 10, no. 3 (2012): 242-255.

Tables

Table 1
Descriptive Statistics
Add Health Analysis Sample (N=15,024)

| Variable | Wave | Mean | Std. Dev | Min | Max |
|----------------------------|------|--------|----------|-----|-----|
| Depression Scale | 3 | 4.64 | 4.09 | 0 | 26 |
| Bothered by things | 3 | 0.54 | 0.69 | 0 | 3 |
| Could not shake off blues | 3 | 0.34 | 0.66 | 0 | 3 |
| Felt not as good | 3 | 0.73 | 0.94 | 0 | 3 |
| Distracted | 3 | 0.62 | 0.75 | 0 | 3 |
| Depressed | 3 | 0.35 | 0.65 | 0 | 3 |
| Too Tired | 3 | 0.64 | 0.73 | 0 | 3 |
| Did not enjoy life | 3 | 0.65 | 0.83 | 0 | 3 |
| Sad | 3 | 0.51 | 0.68 | 0 | 3 |
| People dislike you | 3 | 0.27 | 0.56 | 0 | 3 |
| Depression Scale | 4 | 2.62 | 2.56 | 0 | 15 |
| Time (days) | 3 | 224.43 | 75.64 | 0 | 402 |
| Indicator for Post 9/11 | 3 | 0.78 | 0.41 | 0 | 1 |
| Black | All | 0.22 | 0.41 | 0 | 1 |
| Hispanic | All | 0.16 | 0.37 | 0 | 1 |
| Other Race | All | 0.08 | 0.27 | 0 | 1 |
| Male | All | 0.47 | 0.50 | 0 | 1 |
| Age | 3 | 21.95 | 1.77 | 18 | 28 |
| Family Income (\$1,000s) | 1 | 45.91 | 40.20 | 0 | 990 |
| Maternal Education | 1 | 13.21 | 2.27 | 0 | 17 |
| PVT Score | 1 | 100.51 | 14.07 | 13 | 146 |
| Missing PVT | 1 | 0.05 | 0.21 | 0 | 1 |
| Missing Family Income | 1 | 0.24 | 0.43 | 0 | 1 |
| Missing Maternal Education | 1 | 0.10 | 0.30 | 0 | 1 |
| Missing State | 1 | 0.00 | 0.07 | 0 | 1 |
| Hopefulness | 1 | 2.81 | 0.98 | 1 | 4 |
| Never/Rarely Hopeful | 1 | 0.11 | 0.32 | 0 | 1 |
| Sometimes Hopeful | 1 | 0.26 | 0.44 | 0 | 1 |
| Hopeful A Lot of Time | 1 | 0.34 | 0.47 | 0 | 1 |
| Hopeful Most/All Time | 1 | 0.29 | 0.45 | 0 | 1 |

Table 2
OLS Regression Analysis: Add Health Wave 1 and 3
Main and Interactive Effects of Exposure to 9/11

| Outcome | Depression Scale | Depression Scale |
|----------------------------|----------------------|----------------------|
| Post 9/11 Indicator | 0.436*** (0.103) | 0.218 (0.146) |
| Sometimes Hopeful | 0.049 (0.117) | 0.046 (0.117) |
| A lot Hopeful | -0.581*** (0.114) | -0.852*** (0.171) |
| Always Hopeful | -1.003*** (0.116) | -1.273*** (0.172) |
| Post X Hopeful Scale | | 0.345** (0.163) |
| Time | -0.002*** (0.001) | -0.002*** (0.001) |
| Black | 0.455*** (0.088) | 0.453*** (0.088) |
| Hispanic | 0.234** (0.099) | 0.237** (0.099) |
| Other Race | 0.667*** (0.126) | 0.669*** (0.126) |
| Male | -0.802*** (0.066) | -0.801*** (0.066) |
| Age | -0.015 (0.019) | -0.014 (0.019) |
| Family Income | -0.002*** (0.001) | -0.002*** (0.001) |
| Maternal Education | -0.059*** (0.016) | -0.059*** (0.016) |
| PVT Score | -0.027*** (0.003) | -0.027*** (0.003) |
| Missing PVT Score | -0.084 (0.153) | -0.084 (0.153) |
| Missing Maternal Education | 0.304*** (0.110) | 0.304*** (0.110) |
| Observations | 15,024 | 15,024 |
| R-squared | 0.048 | 0.048 |

Notes: Robust standard errors, 1% ***, 5% **. Additional controls not shown: Constant, Missing State Information in Wave 1 Indicator, Missing Family Income Information Indicator.

Table 3
OLS Regression Analysis: Add Health Wave 1 and 3
Interactive Effects of Exposure to 9/11 for Nine Depressive Symptoms

| Outcome | Depression Scale | Bothered by things | Could not shake off blues | Felt not as good | Distracted | Depressed | Too Tired | Did not enjoy life | Sad | People dislike you |
|---------------------|----------------------|-----------------------|---------------------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|---------------------|--------------------------|
| Column | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Post 9/11 Indicator | 0.218 (0.146) | 0.051** (0.025) | -0.002 (0.024) | -0.006 (0.033) | 0.068** (0.027) | 0.015 (0.024) | -0.016 (0.026) | -0.003 (0.030) | 0.103*** (0.025) | 0.007 (0.020) |
| Sometimes Hopeful | 0.046 (0.117) | -0.031 (0.020) | 0.008 (0.019) | -0.054** (0.027) | 0.004 (0.022) | 0.013 (0.019) | 0.030 (0.021) | -0.005 (0.024) | 0.035* (0.020) | 0.046*** (0.016) |
| A lot Hopeful | -0.852*** (0.171) | -0.078*** (0.029) | -0.069** (0.028) | -0.256*** (0.039) | -0.059* (0.032) | -0.076*** (0.028) | -0.076** (0.031) | -0.209*** (0.035) | -0.030 (0.029) | 0.002 (0.024) |
| Always Hopeful | -1.273*** (0.172) | -0.122*** (0.030) | -0.104*** (0.028) | -0.358*** (0.039) | -0.094*** (0.032) | -0.110*** (0.028) | -0.120*** (0.031) | -0.289*** (0.035) | -0.068** (0.029) | -0.008 (0.024) |
| Post X Hopeful | 0.345** (0.163) | 0.013 (0.028) | 0.052** (0.027) | 0.077** (0.037) | 0.001 (0.030) | 0.043 (0.026) | 0.070** (0.030) | 0.070** (0.033) | 0.030 (0.028) | -0.011 (0.023) |
| Observations | 15,024 | 15,024 | 15,024 | 15,024 | 15,024 | 15,024 | 15,024 | 15,024 | 15,024 | 15,024 |
| R-squared | 0.048 | 0.022 | 0.023 | 0.072 | 0.008 | 0.019 | 0.024 | 0.031 | 0.023 | 0.013 |

Notes: Robust standard errors, 1% ***, 5% **. Additional controls include those in previous table

Appendix Tables

Table A1
Descriptive Statistics for Add Health Analysis Sample
Stratified by Wave 1 Hopefulness

| Variable | Wave | Never/Rarely | N=1694 | Sometimes | N=3859 | A Lot | N=5081 | Most/All | N=4390 |
|---------------------------|------|--------------|----------|-----------|----------|--------|----------|----------|----------|
| | | Mean | Std. Dev | Mean | Std. Dev | Mean | Std. Dev | Mean | Std. Dev |
| Depression Scale | 3 | 5.36 | 4.30 | 5.26 | 4.10 | 4.45 | 4.00 | 4.03 | 3.99 |
| Bothered by things | 3 | 0.62 | 0.75 | 0.58 | 0.70 | 0.53 | 0.68 | 0.48 | 0.68 |
| Could not shake off blues | 3 | 0.40 | 0.68 | 0.38 | 0.67 | 0.33 | 0.66 | 0.30 | 0.64 |
| Felt not as good | 3 | 0.98 | 1.05 | 0.88 | 0.98 | 0.68 | 0.89 | 0.57 | 0.87 |
| Distracted | 3 | 0.67 | 0.78 | 0.67 | 0.75 | 0.60 | 0.73 | 0.57 | 0.74 |
| Depressed | 3 | 0.40 | 0.69 | 0.40 | 0.68 | 0.33 | 0.65 | 0.30 | 0.62 |
| Too Tired | 3 | 0.68 | 0.74 | 0.70 | 0.74 | 0.63 | 0.73 | 0.59 | 0.72 |
| Did not enjoy life | 3 | 0.80 | 0.89 | 0.78 | 0.86 | 0.60 | 0.79 | 0.52 | 0.78 |
| Sad | 3 | 0.52 | 0.71 | 0.56 | 0.68 | 0.51 | 0.69 | 0.47 | 0.67 |
| People dislike you | 3 | 0.28 | 0.57 | 0.31 | 0.58 | 0.25 | 0.55 | 0.24 | 0.55 |
| Depression Scale | 4 | 3.01 | 2.66 | 2.97 | 2.69 | 2.49 | 2.48 | 2.33 | 2.45 |
| Time (days) | 3 | 225.16 | 76.13 | 224.70 | 75.59 | 224.85 | 75.38 | 223.42 | 75.80 |
| Indicator for Post 9/11 | 3 | 0.79 | 0.41 | 0.77 | 0.42 | 0.78 | 0.41 | 0.78 | 0.42 |
| Black | All | 0.27 | 0.45 | 0.20 | 0.40 | 0.18 | 0.39 | 0.26 | 0.44 |
| Hispanic | All | 0.21 | 0.41 | 0.19 | 0.39 | 0.15 | 0.36 | 0.13 | 0.34 |
| Other Race | All | 0.08 | 0.28 | 0.09 | 0.29 | 0.09 | 0.28 | 0.07 | 0.25 |
| Male | All | 0.49 | 0.50 | 0.45 | 0.50 | 0.48 | 0.50 | 0.47 | 0.50 |
| Age | 3 | 21.77 | 1.74 | 22.01 | 1.76 | 22.00 | 1.78 | 21.92 | 1.78 |
| Family Income | 1 | 40.92 | 37.55 | 44.36 | 36.62 | 47.25 | 39.28 | 47.63 | 44.80 |
| Maternal Education | 1 | 12.74 | 2.29 | 12.96 | 2.32 | 13.32 | 2.25 | 13.48 | 2.21 |
| PVT Score | 1 | 94.42 | 14.45 | 98.24 | 14.22 | 102.40 | 13.32 | 102.66 | 13.65 |

Table 2A
Predictors of Wave 1 Hopefulness
OLS Regression Analysis

| Outcome | Hopefulness |
|----------------------------|----------------------|
| Black | 0.096*** (0.029) |
| Hispanic | -0.065* (0.035) |
| Other Race | -0.076* (0.043) |
| Male | -0.004 (0.020) |
| Age | 0.015*** (0.005) |
| Family Income | 0.000 (0.000) |
| Maternal Education | 0.024*** (0.004) |
| PVT Score | 0.012*** (0.001) |
| Missing PVT Score | -0.001 (0.037) |
| Missing Maternal Education | -0.105*** (0.026) |
| Observations | 15,024 |
| R-squared | 0.044 |

Notes: Robust standard errors, 1% ***, 5% **. Additional controls not shown: Constant, Missing Family Income Indicator, Missing State Information

Table 3A
 OLS Regression Analysis: Add Health Wave 1 and 3
 Interactive Effects of Exposure to 9/11, Stratified by Wave 1 Hopefulness

| Outcome | Depression Scale | Depression Scale | Depression Scale | Depression Scale |
|----------------------------|----------------------|----------------------|----------------------|----------------------|
| Sample | Never Hopeful | Sometimes Hopeful | A lot Hopeful | Always Hopeful |
| Post 9/11 Indicator | 0.154 (0.329) | 0.228 (0.206) | 0.489*** (0.174) | 0.650*** (0.188) |
| Time | -0.002 (0.002) | -0.003** (0.001) | -0.002** (0.001) | -0.003*** (0.001) |
| Black | -0.029 (0.273) | 0.491*** (0.183) | 0.573*** (0.156) | 0.500*** (0.150) |
| Hispanic | 0.396 (0.301) | 0.098 (0.188) | 0.350** (0.169) | 0.162 (0.192) |
| Other Race | 1.010** (0.399) | 0.345 (0.239) | 0.627*** (0.209) | 0.884*** (0.247) |
| Male | -1.392*** (0.209) | -0.733*** (0.132) | -0.781*** (0.111) | -0.670*** (0.119) |
| Age | 0.033 (0.061) | 0.037 (0.038) | -0.005 (0.032) | -0.081** (0.034) |
| Family Income | 0.002 (0.003) | -0.004* (0.002) | -0.002 (0.001) | -0.003** (0.001) |
| Maternal Education | -0.030 (0.050) | -0.035 (0.031) | -0.062** (0.027) | -0.077*** (0.029) |
| PVT Score | -0.013 (0.008) | -0.030*** (0.005) | -0.030*** (0.005) | -0.029*** (0.005) |
| Missing PVT Score | 0.242 (0.486) | 0.094 (0.304) | -0.118 (0.263) | -0.414 (0.279) |
| Missing Family Income | -0.164 (0.245) | 0.084 (0.154) | -0.054 (0.134) | -0.223 (0.143) |
| Missing Maternal Education | 0.288 (0.306) | 0.071 (0.212) | 0.405** (0.193) | 0.405* (0.214) |
| Missing State Information | 2.140* (1.288) | -0.274 (1.085) | 1.718* (0.906) | 0.017 (0.757) |
| Constant | 7.025*** (1.607) | 8.559*** (1.041) | 8.746*** (0.890) | 10.223*** (0.945) |
| Observations | 1,694 | 3,859 | 5,081 | 4,390 |
| R-squared | 0.037 | 0.031 | 0.036 | 0.039 |

Notes: Robust standard errors, 1% ***, 5% **, 10% *.

Table 4A
Analysis of Attrition between Wave 1 and Wave 3 Shows
No Association between Wave 1 Hopefulness and Attrition

| Outcome | In Wave 3 |
|----------------------------|----------------------|
| Sometimes Hopeful | 0.006 (0.011) |
| A lot Hopeful | 0.019 (0.012) |
| Always Hopeful | 0.010 (0.009) |
| Black | -0.015 (0.017) |
| Hispanic | -0.020 (0.032) |
| Other Race | 0.025 (0.021) |
| Male | -0.066*** (0.009) |
| Age | -0.013*** (0.003) |
| Family Income | 0.000 (0.000) |
| Maternal Education | 0.001 (0.002) |
| PVT Score | 0.002*** (0.000) |
| Missing PVT Score | -0.008 (0.014) |
| Missing Family Income | -0.050*** (0.008) |
| Missing Maternal Education | -0.046*** (0.010) |
| Missing State Information | -0.137*** (0.012) |
| Constant | 0.798*** (0.072) |
| Observations | 20,662 |
| R-squared | 0.021 |

Notes: Robust standard errors, 1% ***, 5% **, 10% *.

Table 5A
Analysis of Predictors of Exposure Assignment Shows
No Association between Wave 1 Hopefulness

| Outcome | 9/11 Treatment |
|----------------------------|---------------------|
| Sometimes Hopeful | -0.011 (0.010) |
| A lot Hopeful | -0.001 (0.012) |
| Always Hopeful | -0.007 (0.011) |
| Black | -0.013 (0.023) |
| Hispanic | 0.014 (0.019) |
| Other Race | 0.001 (0.024) |
| Male | 0.045*** (0.006) |
| Age | 0.005** (0.002) |
| Family Income | 0.000 (0.000) |
| Maternal Education | 0.000 (0.002) |
| PVT Score | -0.000 (0.000) |
| Missing PVT Score | 0.012 (0.019) |
| Missing Family Income | 0.024** (0.009) |
| Missing Maternal Education | 0.020* (0.010) |
| Missing State Information | 0.076*** (0.013) |
| Constant | 0.707*** (0.066) |
| Observations | 15,024 |
| R-squared | 0.006 |

Notes: Robust standard errors, 1% ***, 5% **, 10% *.