

9-6-2010

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Recommended Citation

Yanos, Philip T.; West, Michelle L.; and Smith, Stephen M., "Coping, productive time use, and negative mood among adults with severe mental illness: A daily diary study" (2010). *CUNY Academic Works*.
https://academicworks.cuny.edu/jj_pubs/193

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Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Coping, productive time use, and negative mood among adults with severe mental illness: A daily diary study

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ARTICLE INFO

Article history:

Received 2 June 2010

Received in revised form 4 August 2010

Accepted 9 August 2010

Available online 6 September 2010

Keywords:

Coping

Severe mental illness

Time use

Negative mood

Social functioning

ABSTRACT

Most studies on coping among persons with severe mental illness have relied on retrospective self-report methods; a limitation of this methodology is susceptibility to recall bias. The purpose of the present investigation was to expand the current understanding of the impact of coping among persons with severe mental illness by examining coping strategies, mood, and social functioning (operationalized as productive time use) using a daily process design. Twenty-seven adults diagnosed with severe mental illness completed baseline clinical interviews and up to 20 days of nightly telephone interviews addressing coping and daily life. A total of 198 coping efforts were reported for 387 days. Mixed-effects regression analyses examined the association between type of daily coping strategy (problem-centered, neutral, or avoidant) and both daily proportion of time participants spent in productive activity and daily negative mood, controlling for demographic and clinical variables. The results indicated that productive time use was significantly lower on days when avoidant strategies were used, in contrast with days when problem-centered strategies and neutral strategies were used. There was no significant main effect of coping on negative mood, although there was a trend in the expected direction. Findings support the hypothesis that the types of coping strategies adults with severe mental illness use are related to better social functioning on a daily level.

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1. Introduction

Evidence supports that structured psychosocial interventions can facilitate positive outcomes for persons diagnosed with severe mental illness (Kern et al., 2009). A common feature of these programs is education and training in the use of coping skills to manage symptoms and prevent relapse (Mueser et al., 2002); however, coping has rarely been assessed as a mediator of treatment action. Nevertheless, a body of research has emerged demonstrating that persons diagnosed with severe mental illness use a variety of coping strategies to deal with symptoms and problems (Phillips et al., 2009). Terminology varies, but studies have generally

categorized coping strategies according to problem-centered versus avoidant dimensions, and generally demonstrate that problem-centered strategies are associated with better social functioning (Yanos and Moos, 2007).

Most studies on coping among persons with severe mental illness have relied on retrospective self-report methods. A major limitation of this methodology is that it is prone to recall bias (Stone et al., 1998). Daily process studies (Tennen et al., 2000) aim to substantially reduce the impact of recall bias and to improve the validity with which psychological constructs such as mood, stress, and behavior are assessed by having participants record their experience of these variables on a daily (or more than daily) basis. In the only known study to examine coping among adults with severe mental illness using a daily process design, Lardinois et al. (2007) found that the use of non-symptomatic, as opposed to symptomatic coping (roughly corresponding to avoidant coping) was related to less distress on a daily level.

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The purpose of the present investigation was to expand the current understanding of the impact of coping among persons with severe mental illness by examining the impact of coping strategies on mood and social functioning using a daily process design. The proportion of time spent productively was used as a measure of social functioning as recommended in the general and daily process literatures (Krupa et al., 2003; Delespaul, 1995). The potential impact of demographic and clinical factors was also considered. Specific research questions were: 1) Is type of coping strategy used in response to stressors associated with daily productive time use and daily negative mood among persons diagnosed with severe mental illness?; and 2) do demographic and clinical factors influence the relationships between coping and either social functioning or negative mood? It was hypothesized that problem-centered coping strategies would be associated with increased daily productive time use and less negative mood, and that participants with greater positive and negative symptoms would tend to show less productive time use regardless of coping.

2. Experimental/materials and methods

2.1. Participants

Twenty-seven adults diagnosed with severe mental illness (16 male and 11 female) were recruited from 2 community mental health agencies: a day treatment program (14 participants), and 3 assertive community treatment teams affiliated with the same agency (13 participants). Individuals participating in illness self-management services (included both individual and group-based interventions) at these programs were eligible to participate in the study. The study focused on individuals participating in illness management in order to focus particularly on persons more likely to develop new coping strategies during the course of the study.

Participants had a mean age of 45.37 ($SD = 9.13$) and a mean educational level of 11.18 ($SD = 2.17$). Four (14.8%) participants identified themselves as European-American, 16 (59.3%) as African American, 6 (22.2%) as Latino and 1 (3.7%) as Asian/Pacific Islander. Chart reviews revealed that participants were primarily diagnosed with either a psychotic disorder or a mood disorder: 10 (37%) were diagnosed with schizophrenia, 6 (22.2%) with schizoaffective disorder, 3 (11.1%) with bipolar disorder, 6 (22.2%) with major depression or mood disorder NOS, and 2 (7.1%) with post-traumatic stress disorder. Twenty-two (81.5%) of participants also had a secondary substance use disorder diagnosis. Approval was received from all relevant Institutional Review Boards, and all participants provided informed consent.

2.2. Assessments

2.2.1. Baseline interviews

Baseline interviews occurred at the beginning of the study. The first baseline interview consisted of demographic questions, and a qualitative interview focused on stress and coping during the previous six months (analyses of data from this part of the study are reported in Robillotta et al., *in press*). The second baseline interview was conducted 1 to 7 days afterward and was used to clarify some of the issues discussed

in the first interview, and to complete the Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987). The PANSS is a 30-item rating scale completed by clinically trained research staff following a semi-structured interview. For the purposes of this study, two of the five analytically-derived PANSS factor component scores discussed by Bell et al. (1994) were used: positive and negative symptoms.

2.2.2. Daily telephone interviews

The second phase of the study consisted of completing structured 15–20 min interviews each day for 10 straight days on two different occasions (thus, up to 20 days total per participant). Telephone interviews were selected as the means for collecting daily process data from participants based on findings from a pilot study that indicated that participants with severe mental illness found paper-and-pencil diaries to be burdensome and were not likely to complete them at the end of the day. Other methods (e.g., electronic diaries) were considered to be inadequate for collecting the detailed data sought for the study. An initial training session regarding the format of the daily interviews was conducted with participants after the baseline clinical/qualitative interviews were completed. The first 10 interviews were scheduled for roughly 4 weeks after participants had completed baseline interviews. Daily interviews began on a Tuesday and ended on the following Thursday. Telephone calls were made at a mutually agreed upon time between 8 and 10 PM (participants without their own phones were provided with cellular phones for the study). Questions focused on a systematic review of activities during the day, any symptoms experienced, and ways participants coped with symptoms and other problems. Negative mood ratings were based on the degree of agreement on a 1–7 Likert scale with four adjectives derived from previous daily process research (Delespaul, 1995) (lonely, guilty, irritated, and sad) concerning how the participant was feeling at the beginning of the interview. The second 10 consecutive days of telephone interviews occurred roughly 3 months after the first 10 day interview period. Questions for these interviews were identical to questions for the other telephone interviews.

2.3. Data coding

2.3.1. Time use

Participant activities were coded using the 2007 codebook of the American Time Use Survey (Bureau of Labor Statistics, 2007). Primary activity codes were then recoded into broader categories following prior research (Krupa et al., 2003; Shimitras et al., 2003). Ultimately, 10 categories were used: sleep, eating and personal care, purchasing goods, travel, work, socialization, active leisure (including participation in sports, games, and hobbies), passive leisure (including television watching), treatment, and childcare/volunteering. The raw number of minutes spent in each primary activity was recorded by the interviewer. The proportion of daily time spent engaged in a given activity was computed by dividing the number of minutes spent in the activity by the total number of minutes recorded for the day (roughly corresponding to the proportion of a 24-h day spent in the activity). Following previous research (Krupa et al., 2003), indices were created to reflect the overall proportion of the day spent in “productive” activity.

The index of productive activity combined all activities with the exception of sleep and passive leisure.

2.3.2. Coping

Coping strategies for the stressor (including psychiatric symptoms) which the participant reported as being the “most stressful” experience of the day were coded. Based on recommendations in the existing literature (Collins et al., 1999) and our prior research (Yanos et al., 2003), coping responses were categorized as either *problem-centered*, *neutral*, or *avoidant*. Problem-centered strategies were defined as behavioral and cognitive problem-centered actions, social support efforts, and prescribed medication use. Neutral strategies were defined as behavioral and cognitive distraction efforts (e.g., engaging in activities such as house-cleaning to distract, or trying to think about alternate topics to distract), use of non-addictive substances, and emotional acceptance strategies, whereas avoidant strategies were defined as behavioral and cognitive avoidance strategies, use of addictive substances, emotional outburst or resignation, social withdrawal, and doing nothing. Strategies were coded by a research assistant after initial training, although coding was reviewed and checked for inconsistencies by the principal investigator.

2.4. Analyses

Statistical analyses examined whether, within individuals, daily use of specific types of coping strategies (e.g., problem-centered coping) was positively related to daily social functioning and negative mood over time. There is an agreement regarding the need for “multilevel” analytic approaches to adequately examine this type of longitudinal data (Stone et al., 1998; Affleck et al., 1999). A mixed-effects model for repeated measures (Blackwell et al., 2006), which allows for both random and fixed effects to exist in the model, was used. Random effects estimation allows within-subjects variables (which vary at each time point for each participant) to differ across participants, so the procedure generates parameter estimates for within-subject variables for each individual and for the entire sample. Because variance and covariance estimates are based on maximum likelihood estimation methods, mixed regression designs for repeated measures allow for missing data, which is common in longitudinal designs.

Repeated measures of productive time use and negative mood served as the within-subjects dependent variables, and measures of coping from the daily interviews served as the within-subjects independent variable. In addition, the role of individual characteristics and psychopathological factors assessed at baseline were investigated to examine their role as moderators of the effect of coping on social functioning. The productive time-use variable was found to be roughly normally distributed; however, the negative mood variable was found to be substantially skewed toward the low-end of the distribution (i.e., the majority of responses indicated no negative mood).

3. Results

A total of 198 coping strategies were reported for 387 days (coping strategies were only reported on days when stressful

events were reported). The average number of daily phone interviews per participant was 10.85 (range = 3–20; SD = 3.6), and the average number of coping strategies reported per participant was 7.3 (range = 1–17). Participants reported coping with a variety of stressors, including interpersonal stressors (25.9%), health problems (16.9%), psychiatric symptoms (14.9%), daily hassles (e.g., transportation crowding, 13.9%), non-symptomatic emotional stress (e.g., guilt, 8%), traumatic events (e.g., witnessing violence, 5.5%), financial stress (5%), and other miscellaneous issues.

Problem-centered strategies were the most frequently coded as the primary coping strategy, with 100 strategies (50.5%) coded as problem-centered, followed by neutral (n = 74; 37.4%) and avoidant (n = 24; 12.1%). The most common subtypes of problem-centered strategies were seeking social support (32%), followed by self-talk (29%), seeking support from treatment providers (16%), prayer (7%), problem-solving (6%), and medication (6%). The most common subtypes of neutral strategies were behavioral distraction (45.2%), followed by cognitive acceptance (16.4%), ignoring the stressor (12.3%), calming activities (8.2%), neutral religious strategies (8.2%), and relaxation strategies (5.5%). The most common avoidant strategies were sleep (37.5%), anger and other emotions (25%), and behavioral avoidance and isolation (25%), followed by rarely reported strategies such as drug use (4.2%) and violence (4.2%). There was no significant trend in the relationship between type of stressful event and type of coping strategy used.

Mixed-effects regression analyses predicting daily proportion of time participants spent in productive activity were then conducted. Initial analyses suggested that allowing slope to be a random variable, or to differ for each participant, did not significantly contribute to the model, nor did it allow the intercept to vary randomly. Next, fixed effects were investigated, and the full model including all possible fixed effects is included in Table 1. The results of these analyses suggest that there was a main effect of coping strategy on productive time use. Specifically, productive time use was significantly lower on days when avoidant strategies were used, in contrast with days when problem-centered strategies were used. Neutral strategies were not significantly different from avoidant or problem-centered strategies. The parameter estimate suggests that, on days when participants used avoidant strategies in response to stress, the proportion of their time spent in productive activity was 13% lower than on days when they used problem-centered types of coping strategies. There was no main effect of day on time use, indicating that there was no overall change in productive time use over time. Other variables included in the model as fixed effects (subject-level variables) were generally not significant predictors of productive time use. However, diagnosis significantly predicted active time use, with schizophrenia-spectrum diagnoses associated with significantly less productive time use, as did ethnicity, with African American ethnicity associated with significantly more productive time use. The interaction between coping and day was found to be non-significant, indicating that there was no significant relationship between change in use of coping strategy over time and productive time use.

A mixed regression analysis was also conducted to investigate the relationship between coping and negative

Table 1
Effect of coping on productive time use—full model.

Predictor	B	SE	t-value
Day	−0.00094	0.003519	−0.27
Education	−0.01091	0.006789	−1.61
Sex	0.000520	0.03360	0.02
Ethnicity (African American versus other)	0.1941	0.03379	−5.74***
Diagnosis (Schiz. versus other)	0.1123	0.03563	3.15**
PANSS—Positive	0.00266	0.003877	−0.69
PANSS—Negative	0.001457	0.004906	0.30
Coping (Avoid. versus Prob.-Cen.)	−0.1976	0.08293	−2.38**
Coping (Neut. versus Prob.-Cen.)	−0.07821	0.05374	−1.46
Coping * day (Avoid. versus Prob.-Cen.)	0.01020	0.009944	1.03
Coping * day (Neut. versus Prob.-Cen.)	0.006707	0.005237	1.28

**** p<0.001.
 *** p<0.01.
 ** p<0.05.
 * p<0.1.

mood (based on preliminary analyses, the coping variable was dichotomized for these analyses by contrasting problem-centered coping with both neutral and avoidant coping). First, the appropriate random effects for the model were selected. For this model, both slope and intercept were permitted to vary randomly across participants, since these random variables significantly contributed to the model. An unstructured covariance matrix was selected as the best fit for the data. The full model, including all considered fixed effects, is presented in Table 2. Results indicated that there was no significant main effect of coping on negative mood, although a trend in the expected direction (problem-centered coping predicting less negative mood) was evident. There was also no significant effect of day on negative mood, although again there was a trend suggesting a decrease in negative mood over time. The only other subject-level variable that significantly contributed to the model was positive symptoms, as assessed by the PANSS, suggesting that higher levels of baseline positive symptoms were significantly related to increases in negative mood. Due to the relatively poor fit of this model and the skewed distribution of the negative mood variable, analyses also attempted to fit the data using a Poisson distribution. However, using this distribution, which is designed to address this type of skewed data, did not substantially change the findings described above.

Table 2
Effect of coping on negative mood—full model.

Predictor	B	SE	t-value
Day	−0.04448	0.02335	−1.91*
Education	0.07326	0.06590	−1.11
Sex	0.3341	0.3288	1.02
Ethnicity (African American versus other)	−0.05575	0.3435	−0.16
Diagnosis (Schiz. versus other)	0.4315	0.3494	1.24
PANSS—Positive	0.1119	0.03880	2.88***
PANSS—Negative	−0.06521	0.04579	−1.42
Coping (Prob.-Cen. versus other)	−0.3227	0.1883	−1.71*
Coping * day	0.003724	0.03224	0.12

* p<0.1.
 ** p<0.05.
 *** p<0.01.
 **** p<0.001.

4. Discussion

Findings supported the hypothesis that the types of coping strategies that adults with severe mental illness use relate to better social functioning, as defined by the proportion of time spent in productive activity. Specifically, participants spent significantly less time productively (i.e., they slept and watched TV more) on days when they used avoidant strategies to deal with stress. There was no significant difference in productive time use between problem-centered and neutral strategies. This finding may suggest that there is no specific advantage to using one type of strategy over the other, or that the difference was too small to detect in this study. The significant relationship between coping and active time use remained even when clinical and demographic factors were included in the model. These findings provide confirmation that coping is related to improved social functioning on a daily level. The use of daily diary methods in the current study, where coping was assessed shortly after the experience of stressful events, decreased reliance on participant memory in evaluating the relationship between coping and social functioning.

Although there was a trend for avoidant and neutral coping strategies to be related to increased negative mood on days when stress was experienced, this finding was not statistically significant. This finding suggests that there may be an advantage to problem-centered coping strategies with regard to reducing negative mood. Limited statistical power and the non-normal distribution of the negative mood variable may have made it difficult to find statistically significant relationships regarding this outcome variable. Supplemental analyses explored a generalized linear model in an attempt to account for the non-normal distribution of the negative mood variable, but these analyses did not produce substantially different results.

An important possible problem with regard to the relationship between coping and time use should be noted. In the case of sleep, the avoidant coping strategies coded overlapped with a major category of non-productive time use. Although the relationship between coping and productive time use could be attributed to this overlap, follow-up analyses suggested that this would likely not explain the marked relationship between avoidant coping and time use.

Specifically, we found that, although the mean productive time use on days when sleep was reported as the primary coping strategy was 0.33, the mean productive time use on days when other avoidant strategies (including anger and emotions, isolation, drug use and violence) were reported was 0.35, suggesting that productive time use was similarly low whether or not the strategy was sleep.

Findings have implications for understanding how illness self-management services are able to impact the social functioning of persons diagnosed with severe mental illness, and have implications for the refinement and development of such treatment approaches. It is notable that the use of avoidant coping strategies to deal with stress had a marked association with time use in the context of given day (leading to shift of 13%, or roughly 3 h, into non-productive activity). Nevertheless, there was no marked difference between problem-centered and neutral coping in accounting for the positive influence (relative to avoidant coping) on time use, which is consistent with some previous research findings (e.g., Mueser et al., 1997). This suggests that illness management services can recommend that participants use a range of self-talk, social support, distraction, and acceptance strategies, which at least do not appear to negatively impact functioning on a daily level. Nevertheless, there was a suggestion (though non-significant) that negative mood may be reduced by problem-centered, but not neutral coping, although this needs to be examined further in future research.

African-American ethnicity was also found to significantly predict productive time use. While we know of no other study suggesting greater involvement in productive time use among African Americans, a prior study on the organizational involvement of persons with severe mental illness found that African-American ethnicity was associated with greater involvement in non-mental health organizations (such as churches and social clubs) (Wong et al., 2007). It is possible that African Americans living in predominantly African-American communities, such as those examined in this study, have greater opportunities for social participation, although this needs to be explored in future research.

Some important limitations should be noted. First, despite the large number of total observations, the overall sample size was relatively small, which restricted statistical power and likely restricted the ability of the statistical procedure to estimate random effects (perhaps explaining the failure of random effects to contribute to the first mixed-effects model). Further, many participants had several days of missing data, making the number of observations “unbalanced.” While this weakness is minimized by employing mixed-effects regression analyses, missing data could be related to both non-productive time and avoidant coping strategies and could therefore underestimate the association of these variables. While the sample was diverse diagnostically, this diversity may have also increased “error” and reduced the likelihood of observing a significant relationship. A further limitation is that symptom ratings were made before daily interviews and therefore may not represent symptom levels at the time that coping and time use were assessed. Additionally, while our assessments of time use and coping were comprehensive, it is likely that some coping strategies, such as substance use, were underreported due to social desirability bias (or, alternately, that participants

tended to not complete interviews on days when they used substances). Finally, since participants were predominately African-American persons in their mid-40's, and were not randomly selected from the mental health programs but were rather individuals participating in treatment geared at teaching them coping skills, the generalizability of the findings to other settings and populations may be limited. Future research should examine the issue of stress and coping in a larger sample of adults with severe mental illness, including a comparison group of those who are not attending illness management treatment, in order to increase the generalizability of these findings.

Role of funding source

This work was supported by grant K23MH066973 from the National Institute of Mental Health. The NIMH had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

Contributors

Philip T. Yanos designed the study, oversaw data collection and prepared the bulk of the manuscript. Michelle West conducted analyses, wrote of sections concerning the analyses, and reviewed and wrote other sections of the manuscript. Stephen M. Smith reviewed the literature, wrote sections of the introduction, and reviewed and commented on other sections of the manuscript.

Conflict of interest

None.

Acknowledgements

The authors thank Priyanka Upadhyaya, Kara Biondo, Naama Nebenzhal, Carrie Greene, Stephanie Robilotta, Rachel Pallatto, and Michelle Stein for their assistance with data collection and organization, and all the mentors who helped to guide the conceptualization of the project. They also thank the participants who made the project possible.

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