Cultivating Secondary Traumatic Growth Among Healthcare Workers: The Role of Social Support and Self-Efficacy

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Objective: This 2-study longitudinal investigation examined the indirect effects of secondary traumatic stress (STS) on secondary traumatic growth via two mediators: perceived social support and secondary trauma self-efficacy. In particular, we tested if the 2 hypothetical mediators operate sequentially, that is, with secondary trauma self-efficacy facilitating social support (i.e., cultivation hypothesis) and/or social support enhancing self-efficacy (i.e., enabling hypothesis).

Method: Participants in Study 1 (N = 293 at Time 1, N = 115 at Time 2) were behavioral healthcare providers working with U.S. military personnel suffering from trauma. Study 2 was conducted among Polish healthcare workers (N = 298 at Time 1, N = 189 at Time 2) providing services for civilian survivors of traumatic events.

Results: In both studies, multiple mediational analyses showed evidence for the cultivation hypothesis. The relationship between STS at Time 1 and secondary traumatic growth at Time 2 was mediated sequentially by secondary trauma self-efficacy at Time 1 and social support at Time 2. The enabling hypothesis was not supported.

Conclusion: Education and development programs for healthcare workers may benefit from boosting self-efficacy with the intent to facilitate perceived social support.

Keywords: secondary traumatic stress; secondary traumatic growth; social cognitive theory; perceived social support; self-efficacy; mediation

Negative outcomes after direct exposure to traumatic events have been linked to psychological disorders including posttraumatic stress disorder (PTSD), represented by such symptoms as reexperiencing, avoidance, and hyperarousal (Brewin, Andrews, & Valentine, 2000). Secondary traumatic stress (STS), in comparison, is defined by the same set of symptoms resulting from indirect exposure to trauma (Bride, Robinson, Yegidis, & Figley, 2004). This indirect exposure is typified by healthcare providers working with traumatized individuals. The indirect exposure has been associated with many negative consequences including higher distress and increased negative cognitions (Pearlman & Mac Ian, 1995), higher job burnout (Ballenger-Browning et al., 2011), and lower job satisfaction (Devilly, Wright, & Varker, 2009).

In addition to the negative consequences of direct and indirect exposure to trauma, recent research has highlighted the importance of positive changes after exposure to trauma, such as meaning-making processes (Park & Ai, 2006) and posttraumatic growth (Cann et al., 2010). Building on the posttraumatic growth construct, Arnold and colleagues (2005) coined the term vicarious posttraumatic growth, referring to positive changes in schemas about self and the world.
and perceived psychological growth. Trauma-focused providers may experience this type of growth as a result of their work. Although we agreed with Arnold et al.'s conceptualization of vicarious posttraumatic growth, we have chosen to utilize the term secondary traumatic growth as it denotes more clearly the growth resulting from indirect exposure to trauma.

There is limited evidence for the relationships between STS and psychological growth variables among human services workers indirectly exposed to trauma. Positive associations between STS and secondary posttraumatic growth were found in studies enrolling mental health therapists (Brockhouse, Msetfi, Cohen, & Joseph, 2001) and disaster workers (Linley & Joseph, 2006). However, there are two primary limitations of these findings. First, the Brockhouse et al. (2001) study was cross-sectional. And, second, neither study utilized a theory-driven model to elucidate the underlying mechanisms related to posttraumatic growth. In this article, we reported on two studies that were longitudinal and based on social cognitive theory (Bandura, 1997).

**Social Cognitive Theory as a Theoretical Framework**

Social cognitive theory (SCT; Bandura, 1997) highlights bidirectional interactions between three sets of variables: the environment, individual factors, and behavior. Called triadic reciprocal determinism, this framework emphasizes self-regulation as a key mechanism for human adaptation. The triadic system functions through feedback processes operating internally (e.g., self-evaluations) and externally (changes in environmental conditions) and aims at recalibrating efforts toward desired outcomes (e.g., reduction of negative states). Self-efficacy is a critical appraisal factor that is central to the self-evaluative process. Social support operates as a primary environmental resource. We argue that social support and self-efficacy serve as key mediators in the association between STS and secondary traumatic growth.

**Self-efficacy.** Self-efficacy, in the context of traumatic stress, refers to perceived ability to manage environmental demands and personal functioning after adverse or traumatic experiences (Benight & Bandura, 2004). Through positive construal of challenging environmental demands, individuals are able to manage these demands in a more effective manner. Self-efficacy is related to lower levels of secondary traumatic distress in trauma counselors (Ortlepp & Friedman, 2002). Further, there is empirical evidence suggesting self-efficacy may play an important meditational role in the relationship between trauma exposure and psychological distress in disaster survivors (Benight, Ironson et al., 1999) and between stress appraisal and compassion satisfaction in rescue workers (Prati, Pietrantoni, & Cicognani, 2011).

We identified no studies examining the mediation effect of self-efficacy on the relationship between STS and secondary traumatic growth. However, based on well-documented mediating functions of self-efficacy in the context of direct traumatization (Cieslak, Benight, & Lehman, 2008), it may be assumed that self-efficacy would play a mediating role in the relationship between STS and secondary traumatic growth. In our studies, we hypothesized that self-efficacy would mediate the relationship between STS and secondary traumatic growth, with higher STS relating to lower self-efficacy and lower self-efficacy leading to lower secondary traumatic growth (Hypothesis 1).

**Social support.** Social support is a concept that refers to actual aiding resources provided by others (i.e., received social support) or to the perception of availability of aiding resources (i.e., perceived social support; Lin, 1986). Higher social support leads to lower negative consequences of direct traumatization (e.g., lower PTSD; Griffith, 2012) and higher positive changes after a traumatic event such as posttraumatic growth (Cieslak et al., 2009; Luszczynska, Sarkar, & Knoll, 2007). Similarly to self-efficacy, social support may be considered a mediator in the relationship between STS and secondary traumatic growth. Although we identified no research on the mediating role of social support in this relationship, there is evidence showing that social support mediates the relationship between posttraumatic distress symptoms and posttraumatic growth (Hogan & Schmidt, 2002). Therefore, we hypothesized that perceived social support would mediate the effect of STS on secondary traumatic growth. Specifically, higher secondary
traumatic stress would lead to lower perceived social support, and lower perceived social support would predict lower secondary traumatic growth (Hypothesis 2).

*Cultivation and enabling hypotheses.* Self-efficacy and social support have been defined in this investigation as mediators. Schwarzer and Knoll (2007), however, argued that the relationship between support and self-efficacy may be bidirectional. There are two alternative hypotheses explaining the relationship between self-efficacy and social support. The cultivation hypothesis suggests that self-efficacy facilitates social support, whereas the enabling hypothesis states that social support enhances and protects self-efficacy (Schwarzer & Knoll, 2007). Previous studies supporting the cultivation hypothesis showed that self-efficacy reduced depressive symptoms through the mediating effect of received social support (Schwarzer & Gutiérrez-Doña, 2005; Schwarzer & Knoll, 2007). In studies testing the enabling hypothesis, self-efficacy mediated the effect of perceived social support on distress (Benight, Swift et al., 1999) and quality of life (Amir, Roziner, Knoll, & Neufeld, 1999) and the effect of received social support on posttraumatic growth (Cieslak et al., 2009; Łuszczynska et al., 2007).

Although both the cultivation and enabling hypotheses have been supported by empirical findings, no studies have examined these hypotheses in the context of indirect exposure to trauma. We hypothesized that the effect of STS on secondary traumatic growth would be mediated first by secondary trauma self-efficacy and then by perceived social support (Hypothesis 3, cultivating effect), and/or mediated first by perceived social support and then by self-efficacy (Hypothesis 4, enabling effect). All four hypotheses were tested in two longitudinal studies. Study 1 enrolled behavioral healthcare providers working with military patients suffering from trauma. Civilian healthcare providers offering services for trauma survivors took part in Study 2.

**Study 1**

**Method**

*Participants.* The study was a part of the SupportNet project, investigating predictors of secondary traumatic stress and job burnout among behavioral and mental healthcare providers working with the U.S. military personnel suffering from trauma. Inclusion criteria were as follows: (a) working for at least one year as a clinical psychologist, counselor, social worker, physician or nurse; (b) providing services for a military population; and (c) being indirectly exposed to trauma through interaction with patients. Of 310 respondents who completed the online survey at Time 1 (T1), 293 participants (98 males, 33.4%) were qualified for the present study based on the inclusion criteria. Of those who completed the T1 assessment, 115 participants (33 males, 28.7%) took part in Time 2 (T2) measurement 6 months later.

Table 1 displays the demographic characteristics. Participants experienced indirect exposure to different types of traumatic events through interaction with clients, including, for example, sudden unexpected death of someone close (89.4%), life-threatening illness or injury (88.1%), military combat (86.7%), sexual assault (84.3%), physical assault (82.6%), transportation accidents (80.9%), and natural disasters (66.6%). Additionally, all participants were directly exposed to trauma, with the average number of 3.23 (standard deviation $[SD] = 1.90$) traumatic events reported per person in a lifetime.

*Measures.* Participants completed a set of questionnaires evaluating STS, perceived social support, secondary trauma self-efficacy, and secondary traumatic growth. Indirect exposure to trauma and demographic variables were assessed as possible factors that should be controlled when testing the hypotheses.

*Secondary traumatic stress.* Secondary Traumatic Stress Scale (Bride et al., 2004) is a 17-item questionnaire used to measure the frequency of STS symptoms in the past month. It comprises the Intrusion subscale (five items), the Avoidance subscale (seven items), and the Arousal subscale (five items). The present study only used a total score of all items. Using a 5-point response scale, ranging from 1 (never) to 5 (very often), participants evaluated frequency
Table 1

Descriptive and Demographic Statistics for Study 1 and Study 2

<table>
<thead>
<tr>
<th>Measure</th>
<th>Study 1 T1</th>
<th>Study 1 T2</th>
<th>Study 2 T1</th>
<th>Study 2 T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>48.91 (12.83)</td>
<td>50.27 (12.59)</td>
<td>35.37 (8.48)</td>
<td>35.08 (8.12)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>195 (66.6%)</td>
<td>82 (71.3%)</td>
<td>226 (75.8%)</td>
<td>150 (80.6%)</td>
</tr>
<tr>
<td>Male</td>
<td>98 (33.4%)</td>
<td>33 (28.7%)</td>
<td>69 (23.2%)</td>
<td>36 (19.0%)</td>
</tr>
<tr>
<td>Intimate relationship</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In a long-term relationship</td>
<td>224 (76.5%)</td>
<td>81 (70.4%)</td>
<td>219 (73.5%)</td>
<td>146 (77.2%)</td>
</tr>
<tr>
<td>Not in a long-term relationship</td>
<td>62 (21.2%)</td>
<td>31 (27.0%)</td>
<td>77 (25.8%)</td>
<td>42 (22.2%)</td>
</tr>
<tr>
<td>Highest degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>1 (0.3%)</td>
<td>0 (0%)</td>
<td>62 (20.8%)</td>
<td>35 (18.5%)</td>
</tr>
<tr>
<td>Associate's degree</td>
<td>1 (0.4%)</td>
<td>0 (0%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>6 (2.0%)</td>
<td>2 (1.7%)</td>
<td>65 (21.8%)</td>
<td>37 (19.6%)</td>
</tr>
<tr>
<td>Master's degree</td>
<td>130 (44.4%)</td>
<td>55 (47.8%)</td>
<td>166 (55.7%)</td>
<td>114 (60.3%)</td>
</tr>
<tr>
<td>Doctorate degree</td>
<td>155 (52.9%)</td>
<td>58 (50.4%)</td>
<td>3 (1.0%)</td>
<td>1 (0.5%)</td>
</tr>
<tr>
<td>Profession</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115 CP (39.2%)</td>
<td>41 CP (35.7%)</td>
<td>143 HCP (48.0%)</td>
<td>86 HCP (45.5%)</td>
<td></td>
</tr>
<tr>
<td>77 counselors (26.3%)</td>
<td>27 counselors (23.5%)</td>
<td>113 SW (37.9%)</td>
<td>77 SW (40.7%)</td>
<td></td>
</tr>
<tr>
<td>56 SW (19.1%)</td>
<td>21 SW (18.3%)</td>
<td>37 others (12.4%)</td>
<td>23 others (12.2%)</td>
<td></td>
</tr>
<tr>
<td>35 HCP (11.9%)</td>
<td>7 HCP (6.1%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. T1 = Time 1, T2 = Time 2; SD = standard deviation; CP = clinical psychologist; HCP = healthcare provider; SW = social worker. Sample size for Study 1: N_{T1} = 293, N_{T2} = 115. Sample size for Study 2: N_{T1} = 298, N_{T2} = 189. Some percentages did not add up to 100% because of missing data. Long-term relationship included married couples and couples in a committed relationship.

of each symptom in relation to their work with patients who had been exposed to traumatic events. Sample items are “I felt emotionally numb” and “I felt jumpy.” Cronbach's alpha was .94 for both T1 and T2 assessments.

Secondary trauma self-efficacy. Because there is evidence that the domain-specific measures of self-efficacy are more useful in predicting adaptation than are the general ones (Luszczynska, Scholz, & Schwarzer, 2005), we employed self-efficacy specific to STS. Secondary trauma self-efficacy is defined as the perceived ability to cope with the challenging demands resulting from work with traumatized clients and the perceived ability to deal with the secondary traumatic stress symptoms. Secondary Trauma Self-Efficacy Scale (Cieslak et al., 2013) is a 7-item questionnaire based on other self-efficacy instruments that were designed to measure perceived ability to cope with demands resulting from direct exposure to trauma and perceived ability to deal with posttraumatic stress symptoms (e.g., Lambert, Benight, Harrison, & Cieslak, 2012). Secondary trauma self-efficacy scale measures self-efficacy in the context of an indirect exposure to trauma. Participants rate the degree of perceived capability on a 7-point scale, ranging from 1 (very incapable) to 7 (very capable). The stem “How capable am I to . . . ” is followed by such items as “deal with the impact these people have had on my life.” Cronbach’s alphas were .87 (T1) and .91 (T2).

Perceived social support. Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item questionnaire measuring availability of social support from family (four items), friends (four items), and broadly defined significant others (four items). A total score of all items was used in further analyses. The instruction was modified to measure perceived social support in the context of work-related demands in the past month. Participants rated the degree of agreement for each item on a 7-point scale, ranging from 1 (very
strongly disagree) to 7 (very strongly agree). Sample items are “I can talk about my problems with my friends” and “My family really tries to help me.” Cronbach’s alpha was .94 for both T1 and T2.

Secondary traumatic growth. Posttraumatic Growth Inventory-Short Form (PTGI-SF; Cann et al., 2010) was used to assess positive changes resulting from indirect exposure to trauma. The original PTGI-SF is a 10-item self-rated questionnaire that measures experience of significant positive change after a trauma. We modified the instruction by asking participants to rate the degree of change as a result of their indirect exposure to trauma through work with clients. A 6-point response scale ranged from 0 (I did not experience this change) to 5 (I experienced this change to a very great degree). Sample items are “I have a stronger religious faith” and “I established a new path for my life.” Cronbach’s alphas were .93 (T1) and .92 (T2).

Indirect exposure to trauma. Secondary Trauma Exposure Scale (Cieslak et al., 2013) was used to measure indirect exposure to traumatic events. It comprises a list of 10 potentially traumatic events (e.g., natural disasters, sexual assaults, military combat). Participants responded whether they were exposed to each event through their work with traumatized clients. Then they rated how frequently they worked with patients who experienced at least one of the potentially traumatic events on the list, using a 7-point scale, ranging from 1 (never) to 7 (every day).

Demographics. Demographic questions included age, gender, a relationship status, profession, and highest academic degree.

Procedure. The study was approved by the institutional review board (IRB) at the authors’ institution. Providers who were located in the civilian community received the email with a link to the online survey through an online newsletter sent by TriWest Healthcare Alliance, an organization managing health benefits for military patients and their families. Providers located on military installations received the link to the survey in an email from the director of the Department of Behavioral Health at Evans Army Community Hospital at Fort Carson, Colorado, and from the Psychology Consultant to the U.S. Army Surgeon General at San Antonio, Texas. Respondents filled out the survey voluntarily, anonymously, and with no compensation for their time. Approximately 6 months later (mean \( M = 191.90 \) days, \( SD = 14.18 \)), participants who agreed to take part in the T2 assessment received an email invitation to the online survey containing the same set of the questionnaires as in T1.

Analytical procedures. To test whether the data supported the cultivation hypothesis and/or enabling hypothesis, we performed multiple mediation analyses using PROCESS (Hayes, 2012). PROCESS permits for conducting multiple mediator regression analysis, accounting for covariates. Further, PROCESS allows for testing hypotheses assuming that mediators are chained together in a specific sequence (e.g., secondary traumatic stress [the independent variable] predicting social support [the first mediator], which in turn predicts self-efficacy [the second mediator], which predicts secondary traumatic growth [the dependent variable]).

Results of analyses are presented using three types of coefficients. A regression coefficient for each parameter is provided (see Figures 1 and 2). Further, PROCESS estimates the indirect effect coefficient \( (B) \) for each indirect pathway between the independent variable (STS at T1) and the dependent variable (secondary traumatic growth at T2), accounting for respective mediators and covariates. Bootstrap method was used to test inferences about the significance of mediation effects \( (B \text{ coefficients}) \). The bootstrap approach is considered superior to normal theory-based Sobel’s test for the significance of the mediation (Hayes, 2012). Finally, we calculated partially standardized indirect effect size coefficients, \( ab_p \) (Preacher & Kelley, 2011), for each indirect pathway.

To test the cultivation and enabling hypotheses as well as the hypotheses assuming simple mediating effects of self-efficacy and social support, we estimated \( B \) coefficients and confidence
Figure 1. Model 1, referring to the cultivation hypothesis, being tested with the multiple mediation analysis.

Note: A value before the slash is standardized regression coefficient (i.e., $\beta$) for Study 1, and value after the slash is $\beta$ for Study 2. T1 = Time 1; T2 = Time 2; ST Stress = secondary traumatic stress; ST Growth = secondary traumatic growth. Additionally, the following effects were controlled in the analyses: (a) the effects of T1 indirect exposure on T1 secondary trauma self-efficacy ($\beta = -.10$, p = .19 for Study 1 and $\beta = .06$, p = .27 for Study 2), T2 social support ($\beta = .05$, p = .42 for Study 1 and $\beta = .05$, p = .45 for Study 2), and T2 secondary traumatic growth ($\beta = -.11$, p = .18 for Study 1 and $\beta = -.06$, p = .32 for Study 2); (b) the effects of T1 social support on T1 self-efficacy ($\beta = .18$, p = .03 for Study 1 and $\beta = .15$, p = .01 for Study 2), T2 social support ($\beta = .77$, p < .001 for Study 1 and $\beta = .29$, p < .001 for Study 2), and T2 secondary traumatic growth ($\beta = -.11$, p = .41 for Study 1 and $\beta = .01$, p = .83 for Study 2); (c) the effects of T1 secondary traumatic growth on T1 self-efficacy ($\beta = .28$, p < .001 for Study 1 and $\beta = .13$, p = .02 for Study 2), T2 social support ($\beta = -.05$, p = .44 for Study 1 and $\beta = -.07$, p = .28 for Study 2), and T2 secondary traumatic growth ($\beta = .51$, p < .001 for Study 1 and $\beta = .58$, p < .001 for Study 2). Values displayed only for completers.

***$p < .001$. **$p < .01$. *$p < .05$.}

...
between completers and dropouts in terms of STS at T1, \( t(291) = 0.17, p = .87 \); secondary trauma self-efficacy at T1, \( t(291) = 0.29, p = .77 \); perceived social support at T1, \( t(291) = 0.08, p = .94 \); secondary traumatic growth at T1, \( t(291) = 1.25, p = .21 \); indirect exposure to trauma, \( t(291) = 0.65, p = .52 \); age, \( t(287) = 1.61, p = .11 \); gender, \( \chi^2(1) = 2.38, p = .12 \); relationship status, \( \chi^2(1) = 2.82, p = .09 \); profession, \( \chi^2(3) = 5.79, p = .12 \); and education, \( \chi^2(4) = 2.48, p = .65 \).

**Multiple mediation analyses.** To test the four hypotheses, two multiple mediation models were analyzed. Model 1 was designed to verify Hypothesis 1 (with self-efficacy at T1 as a mediator), Hypothesis 2 (with social support at T2 as a mediator), and Hypothesis 3 (i.e., cultivation process). In Model 2, Hypotheses 1 and 2 were tested again (but with mediators measured at T2 and T1, respectively), and Hypothesis 4 (i.e., enabling process) was evaluated.

**Model 1**

First, data obtained from completers were analyzed. The multiple mediation analysis for Model 1 showed that Pathway 1, testing the simple mediation effect of secondary trauma self-efficacy at T1 (Hypothesis 1) and Pathway 2 testing the simple mediation role of perceived social support at T2 (Hypothesis 2), were not significant (Table 3).

Second, analyses conducted with dropout values imputed showed that Pathway 1 was significant (Table 3). In particular, higher STS (T1) was related to lower secondary trauma self-efficacy (T1), \( \beta = -.60, p = .001 \), and lower self-efficacy (T1) predicted lower secondary traumatic growth (T2), \( \beta = .11, p = .04 \). Furthermore, Pathway 2 was significant (Table 3). Higher STS (T1) explained higher perceived social support (T2), \( \beta = .07, p = .06 \), which in turn was associated with lower secondary traumatic growth (T2), \( \beta = .32, p = .001 \).

**Testing for the cultivation hypothesis.** When the completers’ data were analyzed, Pathway 3 of Model 1 was significant, indicating that the cultivation hypothesis was supported (Table 3). Figure 1 shows standardized regression coefficients for each path in Model. After
### Table 2

**Means, Standard Deviations, Pearson's Correlations Among Study Variables for Study 1 and Study 2**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Study 1</th>
<th>Study 2</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Indirect exposure</td>
<td>–</td>
<td>.12*</td>
<td>.14</td>
<td>–</td>
<td>–.03</td>
<td>–.06</td>
<td>–.02</td>
<td>–.08</td>
<td>.10</td>
<td>.01</td>
<td>6.18 (1.03)</td>
<td>4.65 (1.72)</td>
</tr>
<tr>
<td>2. STS T1</td>
<td>-.03</td>
<td>–</td>
<td>.79***</td>
<td>–.16**</td>
<td>–.10</td>
<td>–.65***</td>
<td>–.54***</td>
<td>–.06</td>
<td>–.05</td>
<td>1.88 (0.66)</td>
<td>2.32 (0.65)</td>
<td>9.21***</td>
</tr>
<tr>
<td>3. STS T2</td>
<td>.02</td>
<td>.76***</td>
<td>–</td>
<td>–.15*</td>
<td>–.20**</td>
<td>–.60***</td>
<td>–.61***</td>
<td>–.03</td>
<td>.01</td>
<td>1.78 (0.65)</td>
<td>2.28 (0.67)</td>
<td>6.38***</td>
</tr>
<tr>
<td>4. Social support T1</td>
<td>.11</td>
<td>.23***</td>
<td>–</td>
<td>.36***</td>
<td>–</td>
<td>.25***</td>
<td>.22**</td>
<td>.12*</td>
<td>.14</td>
<td>5.77 (1.07)</td>
<td>5.00 (1.50)</td>
<td>7.17***</td>
</tr>
<tr>
<td>5. Social support T2</td>
<td>.08</td>
<td>.20*</td>
<td>.27**</td>
<td>.80***</td>
<td>–</td>
<td>.34***</td>
<td>.36***</td>
<td>.02</td>
<td>.17*</td>
<td>5.68 (1.16)</td>
<td>5.02 (1.30)</td>
<td>4.47***</td>
</tr>
<tr>
<td>6. ST self-efficacy T1</td>
<td>.03</td>
<td>–.23**</td>
<td>–.45***</td>
<td>.33***</td>
<td>.37***</td>
<td>–</td>
<td>.65***</td>
<td>.15*</td>
<td>.16*</td>
<td>6.09 (0.77)</td>
<td>5.19 (0.94)</td>
<td>12.72***</td>
</tr>
<tr>
<td>7. ST self-efficacy T2</td>
<td>.05</td>
<td>–.49***</td>
<td>–.57***</td>
<td>.25**</td>
<td>.35***</td>
<td>.62***</td>
<td>–</td>
<td>.13</td>
<td>.14</td>
<td>6.18 (0.84)</td>
<td>5.23 (0.90)</td>
<td>9.15***</td>
</tr>
<tr>
<td>8. ST Growth T1</td>
<td>.11</td>
<td>.10</td>
<td>.18</td>
<td>.13*</td>
<td>.11</td>
<td>.13*</td>
<td>.13</td>
<td>–</td>
<td>.58***</td>
<td>2.35 (1.28)</td>
<td>2.97 (1.07)</td>
<td>6.39***</td>
</tr>
<tr>
<td>9. ST Growth T2</td>
<td>-.06</td>
<td>.06</td>
<td>.00</td>
<td>.19*</td>
<td>.25**</td>
<td>.25**</td>
<td>.23*</td>
<td>.55***</td>
<td>–</td>
<td>2.25 (1.29)</td>
<td>3.01 (0.98)</td>
<td>5.80***</td>
</tr>
</tbody>
</table>

**Note.** T1 = Time 1; T2 = Time 2; Indirect Exposure = indirect exposure to trauma; STS = secondary traumatic stress; ST Self-Efficacy = secondary trauma self-efficacy; ST Growth = secondary traumatic growth. Correlations below the diagonal show values for Study 1 (N\textsubscript{T1} = 293, N\textsubscript{T2} = 115). Correlations above the diagonal show values for Study 2 (N\textsubscript{T1} = 298, N\textsubscript{T2} = 189). Data presented for those who participated in Time 1 and Time 2 assessments.

***p < .001. **p < .01. *p < .05.
### Table 3
Mediating Effects of Perceived Social Support and Secondary Trauma Self-Efficacy in the Relationship Between Secondary Traumatic Stress and Secondary Traumatic Growth

<table>
<thead>
<tr>
<th>Indirect effects pathways</th>
<th>B</th>
<th>SE</th>
<th>Lower</th>
<th>Higher</th>
<th>Effect size</th>
<th>BC 95% CI</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study 1: Model 1</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1. STS T1→ST self-efficacy T1→ST growth T2</td>
<td>-.079/-.088</td>
<td>.095/.043</td>
<td>-.289/-.182</td>
<td>.081/-.013</td>
<td>-.061/-.088</td>
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<td>2. STS T1→Support T2→ST growth T2</td>
<td>.042/.033</td>
<td>.046/.020</td>
<td>-.022/.004</td>
<td>.171/.088</td>
<td>.033/.033</td>
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<td>3. Cultivation hypothesis: STS T1→ST self-efficacy T1→Support T2→ST growth T2</td>
<td>-.041/-.026</td>
<td>.029/.014</td>
<td>-.136/-.064</td>
<td>-.002/-.006</td>
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<tr>
<td><strong>Study 1: Model 2</strong></td>
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<td>4. STS T1→ST self-efficacy T2→ST growth T2</td>
<td>-.100/-.064</td>
<td>.056/.026</td>
<td>-.231/-.124</td>
<td>-.008/-.018</td>
<td>-.077/-.063</td>
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<td>.045/.025</td>
<td>-.163/-.100</td>
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<td>-.024/-.042</td>
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<td>.006/.004</td>
<td>-.022/-.009</td>
<td>.006/.007</td>
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<td>7. STS T1→ST self-efficacy T1→ST growth T2</td>
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<td>8. STS T1→Support T2→ST growth T2</td>
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<td>.008/.013</td>
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<td>.029/.023</td>
<td>-.137/-.110</td>
<td>-.015/-.017</td>
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<td>10. STS T1→ST self-efficacy T2→ST growth T2</td>
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<td>.025/.017</td>
<td>-.081/-.054</td>
<td>.023/.016</td>
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<td>11. STS T1→Support T1→ST growth T2</td>
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<td>.012/.010</td>
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**Note.** SE = standard error; T1 = Time 1; T2 = Time 2; STS = secondary traumatic stress; ST self-efficacy = secondary trauma self-efficacy; Support = perceived social support; ST growth = secondary traumatic growth. Values before the slash were calculated for completers. Values after the slash were calculated using data from completers and T2 dropouts whose values were imputed. Values of indirect effect coefficient (B) presented in bold are significant. Each bootstrap was based on 5,000 repetitions. Bias-corrected (BC) confidence intervals (CI) that do not include zero indicate a significant indirect effect.
controlling for the effects of three covariates (i.e., T1 indirect exposure to trauma, T1 social support, and T1 secondary traumatic growth), high secondary traumatic stress (T1) was related to lower secondary trauma self-efficacy (T1), which in turn predicted lower social support (T2), and then lower social support (T2) was related to lower secondary traumatic growth (T2).

Similar results, confirming the cultivation hypothesis, were obtained when imputed data for dropouts were included in the analysis (Table 3). Again, Pathway 3 of Model 1 was significant.

Model 2

When data obtained from the completers were analyzed, the multiple mediation analysis for Model 2 showed that Pathway 4 was significant (Table 3). Higher STS (T1) predicted lower secondary trauma self-efficacy (T2), and lower self-efficacy (T2) was related to lower secondary traumatic growth (T2; see Figure 2). Pathway 5, testing the mediation effect of social support (T1), was not significant (Table 3) when the analyses were conducted just for completers.

In the analysis accounting for data from completers and imputed dropouts, Pathway 4 was significant (Table 3). High STS (T1) predicted low self-efficacy (T2), $\beta = -0.21$, $p = .001$, and high self-efficacy (T2) was related to high secondary traumatic growth (T2), $\beta = 0.20$, $p = .01$. Pathway 5 was also significant (Table 3). Higher STS (T1) was associated with lower social support (T1), $\beta = -0.21$, $p = .001$, which in turn predicted lower secondary traumatic growth (T2), $\beta = 0.11$, $p = .03$.

Testing for the enabling hypothesis. When data obtained from the completers were analyzed, Pathway 6, representing the enabling hypothesis, was not significant (Table 3). Figure 2 shows standardized regression coefficients for each path. The indirect effect testing enabling hypothesis was not significant when dropouts’ imputed data were included in the analysis (Table 3). In sum, the enabling hypothesis was not supported.

Discussion

Results of Study 1 provided support for the cultivation hypothesis stating that secondary trauma self-efficacy facilitates perceived social support. These two variables constitute a specific order of chained mediators in the relationship between secondary traumatic stress and secondary traumatic growth. The enabling hypothesis was not supported. Further, analyses conducted for completers and analyses including imputed dropout values yielded similar results: The cultivation hypothesis should be accepted, whereas the enabling hypothesis should be rejected. Inconsistency of the results referring to the mediating function of self-efficacy (Hypothesis 1) and social support (Hypothesis 2) requires further investigation. In general, analyses provide tentative support for simple mediating effects of self-efficacy beliefs. The indirect effects of self-efficacy, obtained in simple mediation analysis, were larger than the indirect effects observed for social support. The findings of Study 1 should be replicated on a different sample to confirm that the findings are not specific for behavioral and mental healthcare providers working with traumatized military populations.

Study 2

To rectify the limitation of Study 1 related to a circumscribed client population, all hypotheses were tested again in a longitudinal study among professionals providing services to traumatized civilian populations. Additionally, these professionals were working within a different cultural context, in Poland. Thus, Study 2 was also designed to provide cross-cultural and clinical population validation of the initial findings.

Method

Participants. Healthcare and social workers providing services for civilian survivors of traumatic events were enrolled in the study. Inclusion criteria were (a) working at least one year
as a social worker or healthcare provider (e.g., physician, nurse, or paramedic); (b) providing services for a civilian population suffering from trauma; and (c) being indirectly exposed to trauma through interaction with clients. A total of 298 respondents (69 males, 23.2%) who met these criteria completed the online survey at T1. See Table 1 for sample demographic information. Participants were indirectly exposed to different types of traumatic events at work, including life-threatening illness or injury (89.3%), physical assault (87.6%), sudden unexpected death of someone close (82.6%), transportation accidents (73.5%), sexual assault (52.7%), and natural disasters (30.2%). Only 9.4% of participants were indirectly exposed to military-related trauma. Additionally, 77.9% of participants reported a lifetime direct exposure to a traumatic event. Of those who completed the T1 assessment, 189 participants (36 males, 19%) took part in the T2 measurement.

**Measures.** Respondents completed the same set of measures as in Study 1. These included (a) the Secondary Traumatic Stress Scale ($\alpha_{T1} = .91$ for T1 and $\alpha_{T2} = .93$ for T2); (b) the Secondary Trauma Self-Efficacy Scale ($\alpha_{T1} = .89$ for T1 and $\alpha_{T2} = .88$ for T2); (c) the Multidimensional Scale of Perceived Social Support ($\alpha = .96$ for both T1 and T2); and (d) a modified version of the Posttraumatic Growth Inventory-Short Form ($\alpha_{T1} = .92$ for Time 1 and $\alpha_{T2} = .91$ for Time 2). As in Study 1, only total scores were used for the questionnaires, and the indirect exposure to trauma was measured with one item (frequency of exposure) in the Secondary Trauma Exposure Scale. Instructions for all instruments were modified so that participants were asked to respond to the items in the context of work-related indirect exposure to trauma. The Polish versions of measures were prepared using the back-translation procedure.

**Procedure.** The study was approved by the IRB at the appropriate institution in Poland. Data were collected with a web-based survey. Participants were recruited through professional and online social networks dedicated to specialists working with traumatized clients. Those who volunteered were informed about the study aims, provided informed consent, and filled out the online questionnaires. If participants agreed to take part in the T2 survey, they received an e-mail invitation. The mean time that elapsed between the T1 and T2 was 162.04 days ($SD = 39.72$).

**Analytical procedures.** Missing data were replaced using the multiple imputation method with the same procedures as in Study 1 (Schafer & Graham, 2002; Streiner, 2002). As in Study 1, the data were missing completely at random at T1, Little’s $\chi^2 (12) = 14.73$, $p = .26$, and at T2, Little’s $\chi^2 (9) = 13.88$, $p = .13$. For completers-only analyses, 1.17% of the T1 values were replaced and 0.40% of the T2 values were replaced. When data for completers and dropouts were analyzed, 36.3% of the T2 values were replaced. A series of two multiple mediation analyses were performed using the same procedure and software as in Study 1.

**Results**

**Preliminary analyses.** Table 2 displays the means, standard deviations, and correlations for the study variables. Attrition analysis showed no significant differences between completers and dropouts at T1 in terms of STS, $t(296) = 0.61$, $p = .54$, secondary trauma self-efficacy, $t(296) = 0.57$, $p = .57$, perceived social support, $t(296) = 0.63$, $p = .53$, secondary traumatic growth, $t(296) = 0.86$, $p = .39$, indirect trauma exposure, $t(296) = 1.88$, $p = .06$, age, $t(269) = 0.76$, $p = .45$, intimate relationship status, $\chi^2 (1) = 3.61$, $p = .06$, profession, $\chi^2 (2) = 1.77$, $p = .41$, and education, $\chi^2 (3) = 5.60$, $p = .13$. However, compared to dropouts, completers were more often women than men, $\chi^2 (1) = 4.57$, $p = .03$.

Across the study variables’ mean levels obtained by participants in Studies 1 and 2 were compared (see Table 2). In Study 1, respondents reported significantly higher frequency of indirect exposure to trauma, higher levels of social support (T1 and T2) and secondary trauma self-efficacy (T1 and T2), significantly lower secondary traumatic growth (T1 and T2), and lower STS (T1 and T2) compared to professionals enrolled in Study 2.
Multiple mediation analyses. The cultivation and enabling hypotheses as well as simple mediation hypotheses were tested with the same two multiple mediation models as in Study 1.

Model 1
First, data obtained from the completers were analyzed. Pathway 7, testing the simple mediation effect of T1 secondary trauma self-efficacy (Hypothesis 1), was not significant (Table 3). In contrast, the simple mediation effect of perceived social support (T2) was found to be significant in the relationship between STS at T1 and secondary traumatic growth at T2 (Hypothesis 2; see Table 3, Pathway 8). After accounting for the effects of three T1 covariates, STS (T1) predicted increased perceived social support (T2), which in turn was associated with increased levels of secondary traumatic growth (T2; see Figure 1). Next, analyses were repeated with data obtained from completers and dropouts (after applying multiple imputation procedures). A similar pattern of results emerged (Table 3).

Testing for the cultivation hypothesis. When completers’ data were analyzed, results of the multiple mediation analysis provided support for Hypothesis 3. Please refer to the confidence intervals for Pathway 9 in Table 3. After partialling out the effects of the three covariates, T1 STS was related to lower self-efficacy (T1), and then lower self-efficacy (T1) contributed to the lower level of social support (T2), which in turn was related to lower levels of secondary traumatic growth (T2; see Figure 2). Similar results, confirming the cultivation hypothesis, were obtained when imputed data for dropouts were included in the analysis (Table 3).

Model 2
Results of the simple mediation analysis (conducted for completers) indicated that neither secondary trauma self-efficacy (T2) nor perceived social support (T1) mediated the relationship between STS at T1 and secondary traumatic growth at T2 (see Table 3, Pathways 10 and 11). Similar results were obtained when imputed dropouts’ data were included in the analysis (Table 3). Thus, Hypotheses 1 and 2 were not supported.

Testing for enabling the hypothesis. The analyses conducted for completers showed that Pathway 12, testing the enabling process (Hypothesis 4), was not significant (see Table 3). When imputed data for dropouts were included in the analysis, similar results for Pathway 12 were obtained (Table 3). The enabling hypothesis was not supported.

Discussion
In line with findings obtained in Study 1, results of Study 2 supported the cultivation hypothesis but not the enabling hypothesis. Further, analyses conducted for completers and analyses accounting for dropouts’ imputed data yielded consistent results. There was no support for the hypothesis assuming simple mediating effect of self-efficacy, whereas the simple mediating effects of social support were found only if support was measured at T2 (at the same time when secondary traumatic growth was assessed).

General Discussion
This two-study investigation examined the indirect effects of STS on secondary traumatic growth via perceived social support and secondary trauma self-efficacy. These two mediators were assumed to operate either independently (Hypotheses 1 and 2) or sequentially, that is, with secondary trauma self-efficacy cultivating social support (Hypothesis 3), and/or social support enabling self-efficacy beliefs (Hypothesis 4). Taking into account the findings in both longitudinal studies, general support was obtained for the cultivation hypothesis in the context of the relationship between secondary traumatic stress and secondary traumatic growth.
The partial corroboration of Hypothesis 1 was found in Study 1 when self-efficacy was measured at T2 (Pathway 4); Hypothesis 2 was confirmed in Study 2 when social support was assessed at T2 (Pathway 8). These results, obtained for a group of completers, may suggest that self-efficacy and social support are more likely to mediate the STS—secondary traumatic growth relationship if these mediators are measured more closely to the time when a dependent variable is assessed. This observation needs further investigation because it may shed light on contradictory results of the cross-sectional studies testing the mediating effects of social support or self-efficacy (e.g., Lincoln, Chatters, & Taylor, 2005; Pietrzak et al., 2010).

Another matter requiring further attention is an explanation why we have found partial collaboration for Hypothesis 1 in Study 1 (i.e., for a simple mediating effect of self-efficacy) and for Hypothesis 2 in Study 2 (i.e., for a simple mediating effect of social support). The two primary differences between the two studies were the type of indirect exposure (military versus nonmilitary trauma) and the country where study was conducted (U.S. vs. Poland). Although we do not know if either of these factors may be responsible for the inconsistent results in our studies, there is empirical evidence that direct exposure to battlefield trauma may lead to different outcomes than other types of traumatic exposure, such as civilian terrorism, work, or traffic accidents (Amir, Kaplan, & Kotler, 1996). There is also evidence from studies on direct exposure to trauma that PTSD affects self-related cognitions, such as self-efficacy, more in individualistic cultures (typically Western countries) than in collectivistic cultures (typically Eastern countries; Jobson & O’Kearney, 2008). Moreover, collectivism may function through social support reducing negative consequences of trauma (Moscardino, Scimin, Capello, & Altòe, 2010). The type of indirect exposure and cultural values, such as individualism-collectivism, need to be investigated further as possible factors facilitating or hindering the effects of self-efficacy and social support.

Both studies show robust evidence supporting the cultivation hypothesis. In the context of the relationship between secondary traumatic stress and secondary traumatic growth, self-efficacy facilitated perceived social support when both mediating factors were contextualized in trauma-related work settings. Prior to our study, the cultivation hypothesis has not been tested in the context of secondary traumatization, and it has not been consistently confirmed in other research contexts (cf. Schwarzer & Knoll, 2007). An explanation for the supportive findings with the cultivation hypothesis is that the mediating factors measured were matched to the type of stressful event (i.e., indirect exposure) and the type of outcome (i.e., secondary traumatic growth; Kaniasty & Norris, 1992).

The findings regarding the cultivation hypothesis may have implications for SCT (Bandura, 1997). Social cognitive theory proposes that self-efficacy is a key factor facilitating adaptation in challenging situations. Our results suggest that enhancing self-efficacy helps a long-term adaptational process by facilitating social support. In contrast, enhancing social support without regard for perceptions of self-efficacy may have limited long-term effect on positive outcomes (e.g., perceptions of growth). These results indicate that the interplay between trauma-related consequences and environmental and individual factors may be time-sensitive. Other studies showed that social support may not affect distress one week after a traumatic event; however, it may reduce distress several weeks later (Cook & Bickman, 1990). Moreover, changes in self-efficacy a couple of weeks after trauma have shown to be predictive of subsequent distress 3 months later (Benight, Cieslak, Molton, & Johnson, 2008). Future studies need to consider the time sensitive nature of adaptation processes following indirect exposure to trauma.

The support for of the cultivation hypothesis obtained in both studies may have some practical implications for healthcare workers offering services for traumatized populations. As there are no doubts that offering these kinds of services leads to a higher risk of secondary traumatic stress (Bride et al., 2004), it is important to know what psychological processes may be involved in translating this negative outcome into a positive one (e.g., secondary traumatic growth). Healthcare workers who are at risk for indirect trauma exposure should be offered education about the importance of enhancing specific self-efficacy perceptions and about the role of efficacy beliefs in fostering secondary traumatic growth. However, education alone is rarely enough to promote self-efficacy (Bandura, 1997). Opportunities for skill attainment in the management of STS reactions combined with education will likely yield more empowerment and thus reduce the risk of a negative resource loss spiral (Hobfoll & Lilly, 1993).
Our research has some limitations. Although both of our studies were longitudinal, there were only two measurement points, whereas a four-wave investigation would be optimal to test a sequential multiple mediation model with two mediators. Regarding a methodological limitation related to a longitudinal design, the research procedures did not allow us to explain reasons for dropouts at T2. Furthermore, structural equation modeling could be used for testing the mediational hypotheses and comparing the goodness of fit for Models 1 and 2. Unfortunately, that would require a bigger sample size, which was difficult to achieve considering the specificity of investigated groups. Statistical procedures employed in this article allowed for a robust estimation of indirect effects with the optimal ratio between a sample size and the number of analyzed parameters. Although our assumption was that secondary traumatic growth is a positive outcome and reflects processes of adaptation after indirect exposure to trauma, there are studies indicating that posttraumatic growth may be dysfunctional (Luszczynska et al., 2012). Future investigation of this issue in the context of secondary traumatic growth is required.

Finally, recent research has highlighted the interplay among self-referent thoughts, the presence and absence of positive and negative social support, and secondary traumatic growth (Mc Cormack, Hagger, & Joseph, 2011). Future investigation needs to account for presence (and absence) of both positive and negative support in the relationship between self-efficacy and secondary traumatic growth.

Summarizing, this is the first longitudinal two-study investigation of how social support and self-efficacy operate as mediators between secondary traumatic stress and secondary traumatic growth. Both studies consistently supported the cultivation hypothesis, indicating that self-efficacy being affected by secondary traumatic stress facilitates social support and this indirect pathway contributes to development of secondary traumatic growth.

References


