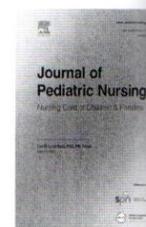




ELSEVIER

Contents lists available at ScienceDirect

Journal of Pediatric Nursing

journal homepage: www.pediatricnursing.org

Participant-generated timelines as a novel strategy for assessing youth resilience factors: A mixed-methods, community-based study

Wendy S. Looman, PhD^{a,*}, Donna J. Eull, PhD, MA^a, Adrianna N. Bell, BSN^a,
Tiffany T. Gallagher, BA^a, Paula V. Nersesian, PhD, MPH^b

^a University of Minnesota School of Nursing, 5-140 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455, USA

^b University of Southern Maine, Masterson Hall, 71 Bedford Street, Portland, ME 04104, USA



ARTICLE INFO

Article history:

Received 30 January 2022

Revised 1 July 2022

Accepted 30 July 2022

Keywords:

Youth

Resilience

Measurement

Participant-generated visual methods

ABSTRACT

Purpose: The purpose of this study was to explore youth perceptions of resilience through participant-generated timelines as a potential new strategy for nursing research and practice.

Design and methods: We used a concurrent triangulation design to collect and analyze qualitative and quantitative data from a statewide, community-based sample of 448 youth ages 8 to 17 years. We collected three sources of data during two waves of data collection in 2019 and 2021: a participant-generated timeline, a brief structured interview, and a PROMIS pediatric global health measure.

Results: The timeline activity was easy to administer and well accepted by youth in a community setting. Youth reporting an adverse experience or mental health challenge in the previous year had unique patterns of variability in the timelines, and more frequently reported certain resilience factors, including family support and regulatory, interpersonal, and meaning-making assets. Pandemic-related differences were noted between the two cohorts.

Conclusions: The timeline drawing activity reflects and extends findings from a standard measure of global health. This activity benefits both the participant and the clinician or researcher by helping youth to communicate how they make sense of the world, honoring different ways of knowing and prompting recollection of coping appraisals and resilience factors.

Practice implications: Participant-generated timelines are a developmentally appropriate and interactive strategy for assessing youth perceptions of their internal strengths. In conjunction with traditional assessments, this strategy may support the identification of malleable targets for intervention in practice with youth who have experienced adversity or mental health challenges.

© 2022 Elsevier Inc. All rights reserved.

There is increasing evidence that resilience in youth is an important focus for strength-based prevention and intervention, yet most strategies for measuring youth resilience rely on traditional survey methods which may fail to capture nuances of event-based perceptions of coping. Developmentally appropriate and participatory strategies for effectively assessing youth perceptions of their internal strengths are needed to support the identification of malleable targets for intervention in research and practice. Participant-generated timelines are a type of draw-and-tell activity with youth that has received little attention in the literature on pediatric nursing and resilience. This study explored timelining as a strategy for assessing youth resilience in a community-based sample of youth, with an aim to inform the translation of this strategy into pediatric nursing practice and research.

Background

Resilience is the capacity to navigate resources that will sustain positive functioning under stress (Ungar, 2019). While some researchers consider resilience to require “significant adversity or risk” (Tusaie et al., 2007, p. 54), the World Health Organization’s (2018) definition of mental health implies that resilience is about coping with normal stresses of life. Research on youth resilience is not new, though opportunities for novel approaches are emerging to advance the science. Based on a scoping review of resilience measures, Christmas and Khanlou (2019) identified a need for youth-based measures of resilience and a positive approach, where youth have a voice in defining their own experience of well-being. Assessing and building resilience is an essential component of trauma-informed care. Recent policy recommendations for trauma-informed pediatric care include a relational approach, creating an emotionally safe space for engagement, and shifting the line of questioning from “what’s wrong with you” to “what happened to you”

* Corresponding author at: 5-140 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455, USA.

E-mail address: loom003@umn.edu (W.S. Looman).

and ultimately to “what’s strong with you” (Forkey et al., 2021, p. 5). Relational strategies are needed to support structured assessment of youth perspectives of coping and resilience and to inform interventions aimed at improving youth well-being.

Participant-generated visual methods, also known as participatory visual and arts-based methods, are activities that allow a participant to share their experience through a visual image such as photovoice, drawing, or digital storytelling. Similar to a “draw-and-tell” activity (Driessnack, 2006), these methods may support resilience assessment in youth beyond what may be accomplished in traditional assessment methods such as interviews and surveys (Kortegast et al., 2019). Participatory visual methods have long been established as effective self-report tools to access the youth’s subjective view of events, perceptions, and difficulties (Hamama & Ronen, 2009; Malchiodi, 1998). Participatory drawings have been used in research to represent children’s perceptions and emotions (Deguara, 2019; Hamama & Ronen, 2009; Literat, 2013), such as in hospitalization (Clatworthy et al., 1999) and pre-procedure dentist visits (Sanglard, Oliveira, Massignan, Polmann, & De Luca Canto, 2022) or surgeries (Puura et al., 2005).

In research, visual activities are an interactive and enjoyable way for youth to provide a more nuanced depiction of their lived realities with researchers (Literat, 2013) and may enhance data credibility by triangulating data sources in mixed methods approaches (Kolar et al., 2015; Noonan et al., 2016). D’Amico et al. (2016) frame these methods as a rights-based approach which recognizes youth as capable of making sense of the world and which honors different ways of knowing. Visual methodologies can be empowering and even therapeutic, giving voice to those (such as young people) who may be reluctant to participate in research or who may not be able to convey their past experience through traditional methods (Guillemin & Drew, 2010). These activities may serve as a “different way in” to a research question, engaging the brain in a way that the child may not have the ability or cognition to express through words alone (Gauntlett & Holzwarth, 2006, p. 84). Similarly, Driessnack (2006) noted that a draw-and-tell activity with children appeared to facilitate the sharing of more information and that the nature of this information was “enlightening” in an interview process (p. 1430).

In both research and practice, a contextual perspective of resilience requires considering the elements of temporality and meaning (Ungar, 2011). For this reason, resilience assessment requires a time-based approach along with engaging the respondent in reflection on their appraisal and response to past challenging events (Kalisch & Kampa, 2021). Timelines are one example of a participatory visual method that enable the participant to both generate data and offer interpretation of past events, and through this witnessing, to make sense of how these events unfolded in a way that can be healing (Snyder, 2020). There are many examples in the literature about the use of timelines as a type of participant-generated visual method in research and practice with adults and children, including studies of marginalized individuals and people with a range of health conditions and social risk factors (e.g., Bagnoli, 2009; Berends, 2011; Kolar et al., 2015; Medina-Muñoz et al., 2016; Patterson et al., 2012; Sheridan et al., 2011). Despite this existing body of literature, most studies tend to focus on marginalized groups, and we found no studies that explored timelines as a form of participant-generated visual methods with a general population of healthy youth. This study addresses that gap, with an aim to inform the development of tools that may be transferable to pediatric nursing practice.

Conceptual framework: the resilience portfolio model

The Resilience Portfolio Model (Fig. 1, Grych et al., 2015) served as the guiding framework for the current study. The Resilience Portfolio Model integrates character strengths associated with well-being, drawn from the field of positive psychology (Park et al., 2004). Individually and as a “portfolio”, these strengths support self regulation and

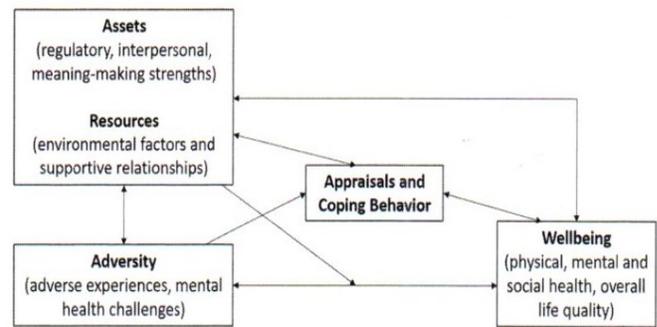


Fig. 1. Grych, Hamby and Banyard’s Resilience Portfolio Model as Applied in the Study. Adapted from Grych, J., Hamby, S., & Banyard, V. (2015). The resilience portfolio model: Understanding healthy adaptation in victims of violence. *Psychology of Violence, 5*(4), 343–354. <https://doi.org/10.1037/a0039671>

goal attainment through impulse control, future-mindedness, and focus (Duckworth et al., 2005). These strengths also reflect an ability to explain and understand one’s experiences as meaningful in a social-ecological context (Bronfenbrenner, 1986; Hamby, Grych, & Banyard, 2018). According to the model, assets and resources have a moderating effect on well-being outcomes by reducing the impact of adversity. An individual’s resilience portfolio shapes how they respond to adversity through appraisals and coping. Emerging research suggests that the intensity (density) and variety (diversity) of strengths are also important constructs in resilience (Gonzalez-Mendez et al., 2021; Hamby, Grych, & Banyard, 2018). Specifically, *regulatory, interpersonal, and meaning-making* strengths may work together in an additive way as protective factors in supporting thriving after adversity.

Conceptual definitions: functional assets

According to the Resilience Portfolio Model (Grych et al., 2015), assets and resources are protective factors that work synergistically to support thriving in the face of challenges. Functional assets are personal characteristics that fall into three domains: self-regulation, interpersonal strengths, and meaning making. Self regulation involves goal-driven behavior both during a challenging situation and over longer periods of time and has been linked to positive outcomes through perseverance and grit (Duckworth et al., 2005), the capacity to experience and maintain positive affect (Russo-Netzer & Shoshani, 2020), gratitude (Layous et al., 2017), optimism, and endurance (Grych et al.). Interpersonal strengths are defined as personal characteristics that enhance social bonds and foster the development and maintenance of close and supportive relationships (Grych et al.). These characteristics can be reflected in interpersonal actions such as expressing compassion (Hamby, Grych, and Banyard, 2018), seeking social support, and engaging with groups and individuals (Hamby, Taylor, et al., 2018). Meaning-making strengths reflect an individual’s capacity to make sense of one’s experiences, particularly when these experiences are challenging and when the individual can integrate these experiences into their broader beliefs about themselves and their place in the world (Grych et al.). While it may be linked to a spiritual or religious connection for some, meaning making may also be reflected in a future orientation, a sense of purpose, and a sense of being appreciated by others (Grych et al., Hamby, Taylor, et al., 2018; Hamby et al., 2019).

Conceptual definitions: resources for resilience

In the Resilience Portfolio Model, resources consist of environmental factors and supportive relationships (Grych et al.). Environmental factors consist of characteristics of the social ecology that promote healthy youth functioning, such as group connectedness, collective efficacy, and positive school climate (Hamby et al., 2019). Supportive relationships are connections to people who provide emotional and instrumental support, including parents, teachers, and peers. Research has consistently demonstrated that caring relationships with others across the

lifespans provide nurturance and foster the development of self-regulation (Biglan et al., 2012; Lampropoulou, 2018).

Purpose of the present study

In this study we applied the Resilience Portfolio Model to explore youth perceptions of quality of life and resilience through participant-generated timelines as a potential new strategy for pediatric nursing research and practice. We aimed to address three questions in this research:

1. What is the usefulness and feasibility of using a brief timelining activity to assess resilience in youth?
2. Among youth who experienced an adverse event or mental health challenge in the previous year, what assets and resources are appraised as relevant to their resilience?
3. To what extent does a timeline drawing activity reflect and extend findings from a traditional survey measure of global health?

Methods

We used a concurrent triangulation design (Creswell et al., 2003) to collect and analyze qualitative and quantitative data from a statewide, community-based sample of youth. We collected the following data during two waves of data collection in 2019 and 2021: a participant-generated timeline depicting perceived life quality over the past year, a brief structured interview, and a survey. Our approach, depicted in Fig. 2, was similar to what Castro et al. (2010) described as an *integrated mixed methods methodology*, including theory-guided conversion of qualitative themes into quantitative items during the analysis phase, and recontextualization of findings within the theoretical framework in the interpretation phase.

Context: community-based data collection

The local Institutional Review Board approved the research protocol for this study. The protocol was administered as part of the Driven to Discover research mechanism (D2D, 2020) at the Minnesota State Fair. The D2D research facility provides turn-key research space for minimal-risk research on the fairgrounds, enabling researchers the opportunity to recruit, enroll, and collect data from fairgoers. The

Minnesota State fair is the highest daily-attended event in all of North America (D2D, 2020). An estimated 20% of the state population attends the fair each year, and over 60,000 fairgoers visit the D2D facility in a typical year, allowing recruitment of a large convenience sample that is representative of the state population. Historically, demographic data for visitors to the D2D facility indicate that the racial and ethnicity makeup of these study participants closely aligns with state demographics, and outstate (non-urban) visitors make up at least one quarter of the visitors who enroll in these studies (Demerath & Spector, 2021). Data were collected during the 2-week period of the state fair in 2019 and 2021, the 12 days leading up to and ending on Labor Day each year. Data were not collected in 2020 due to the COVID-19 pandemic; the 2021 data collection wave occurred during a window of the pandemic when case rates had dropped and large gatherings had resumed in the state.

Sample

The sample was 448 youth ages 8–17 years who were able to understand, speak, and read English. Fairgoers who visited the D2D building were invited to participate in this study at one of several booths in the building. Interested participants were given a verbal explanation of the study followed by an informed consent process if they indicated interest. Youth ages 8–12 were required to have a parent or guardian provide permission and informed consent, and youth ages 13–17 were included with a waiver of parental permission. All youth participants provided verbal assent and could end their participation at any time. Table 1 provides an overview of the characteristics of participants enrolled in the study.

Measures

Following the consent process, the protocol consisted of a survey, a structured participant-generated timeline drawing activity, and a brief follow-up interview. The protocol activities lasted approximately 15 min per participant. The survey included demographic items and a compilation of existing measures; for this study we report only the data from the demographic items and a global health measure administered to all participants at both time points. To measure global health, we used a 7-item pediatric global health measure (PGH-7, Forrest et al., 2014). The PGH-7 is a self-report instrument for children ages

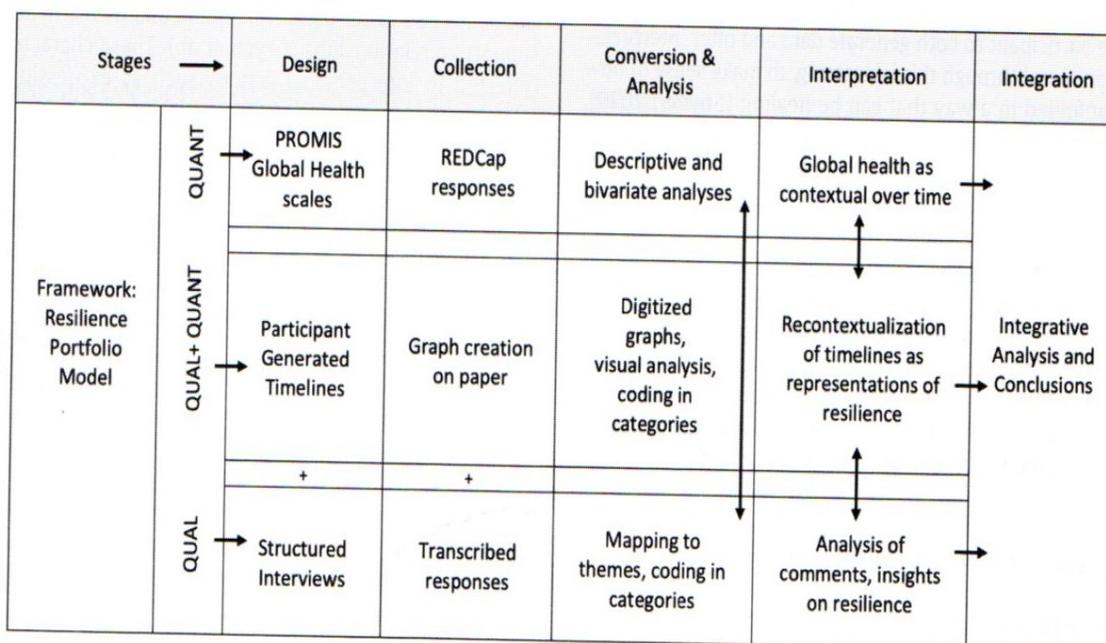


Fig. 2. Schematic of integrated mixed methods approach for the study.

Note. Schematic adapted from Castro, F. G., Kellison, J. G., Boyd, S. J., & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analyses. *Journal of mixed methods research*, 4(4), 342–360.

Table 1
Sample characteristics.

Participant characteristics	2019 cohort (N = 314)		2021 cohort (N = 134)	
	n	%	n	%
Gender				
Male	131	41.7	57	42.5
Female	182	57.9	69	51.5
Nonbinary or transgender	1	0.4	6	4.5
Prefer not to answer	–	–	2	1.5
Race				
White/Caucasian only	217	69.1	88	65.7
Black/African American only	8	2.5	5	3.7
Asian only	22	7.0	9	6.7
American Indian, Alaskan Native, Pacific Islander, or Other only	4	1.3	–	–
Multiple Races	26	8.3	9	6.7
Unknown/Missing	37	11.8	23	17.2
Ethnicity				
Hispanic/Latino	14	4.5	9	6.7
Non-Hispanic/Latino	234	74.5	96	71.6
Unknown/Missing	66	21	29	21.6
Age in years, mean (SD)	12.6 (2.7)		12.6 (2.7)	

5–17 that is part of the Patient Reported Outcome Measurement Information System (PROMIS[®]). The seven items are administered using 5 response categories (scored 1–5), where higher values reflect better health (see Supplemental File, Table S1 for wording of items and response options). The PGH-7 is conceptually harmonized with the PROMIS adult global health measure, designed to provide a brief yet comprehensive assessment of the individual's physical, mental, and social health that is useful in both research and practice (Forrest et al., 2014). The measure is unidimensional and factor invariant by age, demonstrates excellent stability and internal consistency, and has low floor and ceiling effects at the scale and item-levels (Forrest et al.).

We used a timeline graphing activity paired with a brief interview as a tool to elicit participants' perceptions of their trajectory of general life quality over the previous year. The activity consisted of a standardized, study staff-guided line graphing activity followed by a brief structured interview about the drawing. Participants were provided a paper with a blank graph for overall life quality with the X axis anchors of “then” (one year ago) to “now”, and the Y axis anchors of “the worst it could be” to “the best it could be”. The prompt was: “Think about your life in general over the last year, all things considered. We want to know how you would rate your life now, a year ago, and the time in between.” Dots were placed on the graph and connected with a single line by the participant. Additional prompts, the specific follow-up interview questions, and an example are provided in Box 1 and Fig. 3.

Data collection procedure

The survey was administered on iPad tablets using REDCap (Harris et al., 2009), a secure web application designed to capture data for research. All study staff were either nurses or nursing students; the timeline activity and follow-up interview were administered by staff prepared as registered nurses with a baccalaureate degree or higher. Following the timeline drawing activity, participants were asked to tell the interviewer their thoughts behind the graph and to elaborate on any notable points, using the interview guide in Box 1. No identifying data were collected. Timelines and written responses to the follow-up interview were collected, scanned, and stored electronically.

Analysis

To address the first research question, we explored the descriptive data for insights and patterns about the overall usefulness and feasibility of the exercise. Responses to the item, “how easy or hard was this

Box 1

Timeline drawing activity script and follow-up interview questions.

Introductory script

“What I'd like you to do is think about your life in general over the past year, and then I'll have you draw a line on a graph to show how it has changed or stayed the same since this time last year. It doesn't need to be exact – we're just interested in your overall sense of things. When you're done, I will have a few questions for you, and you can tell me about how this went for you.”

Instructions - Script

1. [*Present the blank graph*]. Think about your life in general over the last year, all things considered. We want to know how you would rate your life now, a year ago, and the time in between. We'd like you to draw a single line on the graph to show how things have been over the year. We have some examples to look at if you want to see what it might look like.
2. First, put a dot above the NOW section on the graph to show how your life has been recently (over the past few days).
3. Next, put a dot above the THEN section on the graph to show how your life was a year ago (around this time last year).
4. Next, think about any high points and low points over the last year that you might want to show on the graph. You can use dots for those points if you want.
5. Next, draw a single line to connect the THEN point to the NOW point, with any ups and downs in between to show how your quality of life has been for the whole year.
6. When you're done, I will ask you a few questions about the line you drew.

Follow-up Interview

1. On a scale of 1–10, where 1 is really easy and 10 is really hard, how easy or hard was it for you to do this line graph activity?
2. Let's look at where you rated your life NOW. What's the main reason you put the dot where you did there?
3. Now let's look at where you rated your life a year ago (THEN). What's the main reason you put the dot where you did there?
4. Now let's look at what happened in between. What would you say is most important about the way you drew this line over time? [*Note high and low points on the line graph*].
5. Is there anything else you'd like to tell us about why you drew the line the way you did?

activity” were summarized and the number of participants who withdrew or opted out of one or more portions of the study was calculated. We also summarized anecdotal evidence from staff members who had engaged with the youth in conducting the research and summarized the character and quality of initial data from the timeline activity. To address the second question about assets and resources appraised as relevant to youth resilience, we calculated frequencies of resources and assets by subgroup according to adversity experience and mental health challenge, and used bivariate statistics to determine whether differences between groups were significant. To address the third question about the extent that a timeline drawing activity reflects and extends findings from a traditional survey measure of global health, we integrated PGH-7 survey data with quantified data describing the timeline characteristics, compared means within the adversity and mental health groups, and explored the totality of findings for insights about contextual health and resilience over time. Each of these steps is further elaborated by phase below and depicted in Fig. 2.

Quantitative data: surveys and timelines

Survey data (demographics and global health items) were extracted from REDCap and imported into IBM SPSS (Version 27). Global health

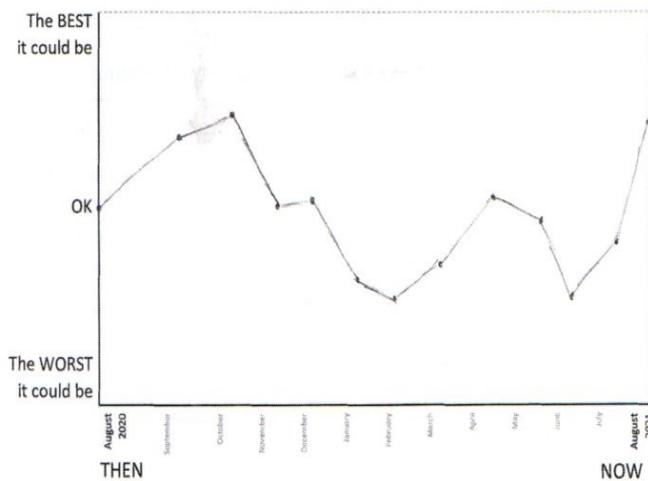


Fig. 3. Example of a Participant-Generated Timeline Representing General Life Quality over the Past Year.

Note. The timeline represents the participant's response to the prompt, "Think about your life in general over the last year, all things considered. We want to know how you would rate your life now, a year ago, and the time in between. Draw a single line on the graph to show how things have been over the year." This is an example of a variable line with two rebound points.

items were summarized individually as interval-level variables. A summed score was also calculated for the seven global health items and converted into standardized T-score values using standard procedures for PROMIS measures where 50 represents the average for the U.S. general pediatric population (Hays et al., 2009; PROMIS - Global Health, 2017). Internal consistency for the summed 7-item scale in this sample was good (Cronbach's alpha = 0.77).

Timeline drawings were scanned and data points from the graphs were extracted using Engauge Digitizer (Mitchell et al., 2021). Numerical values were merged with other quantitative data sources in IBM SPSS. Timeline life quality ratings were standardized as ranging from 0 (the worst it could be) to 100 (the best it could be), and centered on 50 (ok), with time points ranging from day 0 (then) to day 365 (now). From the extracted coordinate data values for each participant, we created variables for life quality *maximum* and *minimum* (highest and lowest points on the graph), *range* (highest minus lowest value on the graph), and *difference over time* ("now" value minus "then" value). The drawings were also saved as digital files and stored in Box Secure Storage for visual and contextual analysis as described below.

Qualitative analysis: interviews and timelines

In the first phase of qualitative analysis, we explored the follow-up interview comments for themes. Interview responses were transcribed to a common file and identifying information removed. A second researcher reviewed the transcribed interviews for accuracy. To ensure rigor through credibility, the remaining steps of qualitative analysis were completed by doctorally-prepared members of the research team with training and experience in qualitative methods; two of these team members have extensive experience in pediatric nursing. Transcribed interviews were reviewed for themes and patterns, and an initial set of challenges and positive experiences was generated from this analysis. Specifically, we identified statements about experiences that were offered as reasons for the placement of the points on the timeline, noting whether these were associated with improvements or declines in overall life quality. Next, we quantified the qualitative data from the follow-up interviews and visual characteristics of the participant-generated timelines. A coding form was created to map interview responses to the identified challenges and positive experiences, and to a set of thematic factors within the domains of resources and regulatory, interpersonal, and meaning-making assets in the Resilience Portfolio Model (see Table 2 for factors in each domain with descriptors).

Each participant timeline and the associated interview text were reviewed to identify the presence of one or more clear "rebound" points depicted on the timeline that could be associated with a comment in the interview about a challenging event (see Fig. 3 for an example of a timeline with two rebound points). We defined a rebound point as a dip in the line followed by a sharp increase or recovery. Each timeline was also characterized as one of the following: *flat and stable* (minimal variability and minimal slope), *flat and rising* (minimal variability and a positive slope), *flat and falling* (minimal variability and a negative slope), or *variable* (moderate or high amount of direction changes in the line). Examples of line types are in the Supplementary file (Fig. S1). Two investigators assigned codes for each participant's line based on the interview text and timeline image, noting representative quotes from the interviews. Codes were assigned for the following: presence of one or more *rebound points*, *line type*, *challenges*, *positive experiences*, *resources*, and *assets*. Codes were reviewed for agreement and differences were resolved based on discussion until agreement was reached.

Integration of qualitative and quantitative data

In this phase of data analysis, we integrated the coded numeric data from the qualitative data with quantitative survey data and timeline values for each participant. Frequency of challenges and positive experiences were calculated for the 2019 and 2021 cohorts. Two new variables were created to characterize participants according to whether they described in the follow-up interview: 1) a mental health challenge (e.g., depression, anxiety, substance use disorder); and/or 2) an adverse experience (e.g., serious illness or death in a family member or close friend, traumatic experience such as house fire). Frequencies of resilience factors were calculated for each of these subgroups. Differences in proportions between those who did and did not experience a mental health challenge were calculated using Pearson chi-square tests for each resilience factor, and this was repeated for the adverse experience variable. Next, we calculated means and standard deviations for global health ratings from the PGH-7 measure and values from the timeline, and used independent samples *t*-tests to compare means for youth by mental health and adversity status on each variable.

Results

The characteristics of the sample are summarized in Table 1. The mean age of participants in both cohorts was 12.6 years ($SD = 2.7$, $Median = 13$), with slightly more females than males in both cohorts. Compared to the 2019 cohort, a greater number of youth in the 2021 cohort (4.5%) identified as non-binary or transgender. The race and ethnicity composition of the sample was similar to that of youth in the state (Minnesota Department of Education, 2021), with around three-quarters of youth identifying their race as white. Race and ethnicity were unknown or missing for a small portion of the sample.

The participant experience of timelining

The vast majority of participants were receptive to the timelining activity and actively engaged with the researchers to complete the protocol. Despite the study booth being located on the fairgrounds amidst attractions, entertainment, and food, youth were often willing to wait in line to participate in the study. Participants described the activity as "fun" and "interesting", and study staff reported that youth participants found the two-axis graphing activity to be familiar and intuitive, with comments such as, "I've done graphing in school - I know how to do this." In response to the question, "how easy or hard was this activity?" on a scale of 1 to 10, where 1 is *easy* and 10 is *hard*, most found the activity *easy* ($M = 3.0$, $SD = 2.1$, $median = 2$, $mode = 1$). All participants were told at enrollment that they could decline to answer any question or stop their participation before completion for any reason without consequence, yet fewer than 2% of participants opted out of one or

Table 2
Coding schema for resilience assets and resources, with exemplars.

Asset	Definition	Exemplars
Regulatory: Endurance	Persistence, sticking with it, pressing on despite challenges, getting through a hard time	"I was dealing with some emotional issues but I got through them." "I was pretty depressed but still had a lot going for me." "It was easier and I started to adjust."
Self-Reliance	Solving problems, figuring things out, being resourceful in coping with challenges	"I found peace focusing on school." "Life is getting better because I'm maturing." "I learned to be with myself."
Interpersonal: Group Connectedness	Belonging to a group or team, working together, feeling connected to a group of others	"I have a bunch of people who I know and I hang out with them and they love me." "I was surrounded by good people." "I have a good friend group."
Social Support Seeking	Seeking out support, finding strength in a support system, seeing relationships as an asset	"I found some friends who I could talk to so things got easier." "I have opened up about what I am struggling with." "The people around me gave me support and strength." "I learned to appreciate things more." "I grew closer to God." "I wrapped my head around the universe." "I have figured out who I am and what makes me happy."
Meaning making: Purpose	Having a sense of purpose in life, knowing what makes life meaningful, expecting good things to happen	"I know I am loved." "My parents and my sister keep me happy and safe." "Life is a great adventure when you have friends that love you." "I said, 'it could only go up from here.'" "Things are getting better for me." "As I go through life, I learn more about positivity and loving myself, I gain happiness."
Mattering	Feeling appreciated, cared about, knowing others are proud of you, being important to others	
Future Orientation	Working hard to make a good future, pursuing goals, living up to potential, seeing a light at the end of the tunnel	
Resources	Definition	Exemplars
Supportive relationships: Peers	Connections to peers who provide emotional and instrumental support	"My relationships with my friends were really strong." "I have a friend that is there for me." "The kids in school know me pretty well."
Family	Connections to family members who provide emotional and instrumental support	"My parents are very supportive." "My relationships with my family are really strong." "Being with my mom helped me." "My parents keep me happy and safe."
Community	Connections to individuals in the community who provide emotional and instrumental support	"I have a support system around me." "I have a teacher who gets me." "My coach is there to listen to me when I need someone to talk to."

Note. Based on the Resilience Portfolio Model by Hamby, Grych, and Banyard (2018).

more portions of the protocol or asked to end their participation early once enrolled.

Table 3 presents the frequency of challenging and positive experiences mentioned in the follow-up interview about the timeline. With limited probing beyond the structured guide during the timeline drawing activity and interview, most participants (91.5%) spontaneously

reported experiences and perceptions that could later be coded as at least one of the identified challenges (72.1%) or positive experiences (78.1%). The most commonly reported challenge was related to school or academic circumstances, with this pattern reflected more strongly in the 2021 cohort. The most commonly mentioned positive experiences described as influencing life quality over the past year were celebrations such as birthdays, holidays, family gatherings, and vacations. Positive experiences were mentioned more frequently than challenges as reasons for line placement in the timeline. For youth in the 2021 cohort, COVID-related challenges were prominent, particularly in the context of school and home.

Table 3
Frequency of challenges and positive experiences reported by participants in the timeline activity, by Cohort.

	2019 Cohort n = 314	2021 Cohort n = 134	Total N = 448
	%	%	%
Challenge			
School or academic circumstance	30.9	48.9	36.2
Family or home-related circumstance	16.2	36.1	22.1
Peer-related circumstance	9.9	18.0	12.3
Mental health concern	9.2	12.0	10.1
Death of close friend or family member	7.3	3.0	6.0
Physical health concern	4.8	5.3	4.9
Serious illness of close friend or family	3.2	2.3	2.9
Future uncertainty	1.9	3.8	2.5
COVID-related concern	N/A	64.7	N/A
Positive experience			
Celebration	29.3	45.1	34.0
School or academic circumstance	21.0	35.3	25.3
Improvement in life situation	19.1	37.6	24.6
Peer-related circumstance	21.0	25.6	22.4
Family or home-related circumstance	16.6	34.6	21.9
Future hopefulness	4.8	1.5	3.8
COVID-related positive experience	N/A	40.6	N/A

Resources and assets identified

Table 4 presents the frequency of resources and assets mentioned in the follow-up interview about the timeline, with significance levels from chi-square tests for differences in proportions. Half (49.8%) of all participants made a comment in the follow-up interview that was coded to at least one asset or resource in the Resilience Portfolio Model. The most commonly mentioned resilience factor was endurance (21.2%), followed by group connectedness (14.4%), and supportive relationships with peers (14.1%). Youth describing an adverse experience in the previous year were more likely than youth without an adverse experience to mention one or more resources for resilience in the follow-up interview about their timeline drawing. Specifically, 24.5% of youth with adverse experiences mentioned family relationships as a resource, compared with 9.9% of youth without an adverse experience. Youth with an adverse experience were also more likely to mention the asset of endurance in the follow up interview, compared with youth without an adverse experience (32.1% vs. 19.8%). Among youth

Table 4
Proportion of participants identifying resilience factors in the timeline activity, by subgroup based on life challenge in the previous year.

Domain	Adversity			Mental Health Challenge		
	No n = 395	Yes n = 53	Sig. ¹	No n = 403	Yes n = 45	Sig. ¹
	%	%		%	%	
Resources identified						
Supportive relationships (peers)	12.9	22.6	0.057	14.2	13.3	0.877
Supportive relationships (family)	9.9	24.5	0.002	11.4	13.3	0.708
Supportive community or neighborhood	0.8	0.0	0.524	0.5	2.2	0.179
Any resource	19.0	32.1	0.027	20.6	20.0	0.919
Assets identified						
Regulatory - endurance	19.8	32.1	0.040	17.9	51.1	<0.001
Regulatory - self-reliance	8.4	3.8	0.242	5.5	28.9	<0.001
Interpersonal - group connection	15.2	9.4	0.261	15.4	6.7	0.114
Interpersonal - social support seeking	2.8	5.7	0.260	2.5	8.9	0.019
Meaning-making - purpose	4.8	9.4	0.162	4.7	11.1	0.072
Meaning-making - mattering	3.3	5.7	0.385	3.7	2.2	0.605
Meaning-making - future orientation	7.6	9.4	0.643	6.7	17.8	0.009
Any asset	44.1	45.3	0.865	41.3	71.1	<0.001

Note. The adversity group consists of the subset of youth who mentioned an adverse experience or serious illness, or death of a friend or family member in the previous year. The mental health challenge subgroup consists of youth who mentioned a mental health challenge in the previous year.

¹ Significance (p values) from Pearson chi-square tests. Bolded values indicate significant differences between groups.

indicating a mental health challenge, 71.1% mentioned one or more assets, compared with 41.3% of youth who did not indicate a mental health challenge. Compared to youth without a mental health challenge, a greater proportion of youth with a mental health challenge had comments coded as a regulatory asset (endurance and/or self-reliance), the interpersonal asset of support-seeking, and/or the meaning-making asset of future orientation (see Table 4).

Additive value of timelining in assessing global health

Table 5 presents a summary of global health measure scores and timeline characteristics by subgroup based on adversity and mental health challenge. Compared with youth who did not describe an

adverse experience in the past year, those with an adverse experience had significantly lower mean scores on the general quality of life item and worse scores on the item, “how often do you feel really sad?”. Youth reporting a mental health challenge had lower scores than those without a mental health challenge on items related to general health, mental health, sadness, and fun with friends. Mean composite PGH-7 T-scores were significantly lower for youth describing mental health challenges, compared to youth not describing a mental health challenge.

The “now” ratings for life quality on the timelines were significantly positively correlated with responses on the PGH-7 quality of life item, though the association was only moderate ($r = 0.464, p < .001$). Mean timeline life quality ratings for the “now” point were significantly

Table 5
Comparison of global health measures and timeline characteristics by subgroup based on life challenge in the previous year.

	Adversity			Mental Health Challenge		
	No Mean (SD)	Yes Mean (SD)	Sig. ¹	No Mean (SD)	Yes Mean (SD)	Sig. ¹
	n = 395	n = 53		n = 403	n = 45	
Global Health¹						
General health	4.06 (0.83)	4.09 (0.71)	0.797	4.10 (0.82)	3.76 (0.83)	0.008
Physical health	3.99 (0.90)	3.96 (0.78)	0.802	4.01 (0.90)	3.82 (0.81)	0.184
Mental health	3.70 (1.08)	3.45 (1.14)	0.121	3.75 (1.07)	3.04 (0.98)	<0.001
Quality of life	4.11 (0.83)	3.77 (1.03)	0.027	4.08 (0.87)	3.93 (0.84)	0.266
Feel sad (reverse scored)	3.42 (0.73)	3.15 (0.84)	0.014	3.41 (0.75)	3.18 (0.72)	0.047
Fun with friends	4.17 (0.73)	4.13 (0.83)	0.724	4.20 (0.73)	3.91 (0.79)	0.013
Parents listen	3.91 (0.92)	3.90 (0.90)	0.948	3.90 (0.93)	3.98 (0.88)	0.620
Global Health T-score ²	48.9 (7.7)	49.9 (7.8)	0.093	49.0 (7.8)	45.2 (6.6)	0.002
Timeline Ratings³						
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Now	80.8 (16.6)	75.8 (19.2)	0.044	80.3 (17.0)	79.4 (16.6)	0.738
A year ago	64.7 (21.5)	58.4 (25.9)	0.095	64.8 (22.0)	56.0 (22.0)	0.011
Maximum rating	88.4 (12.0)	86.9 (12.8)	0.407	88.2 (12.3)	88.3 (10.7)	0.957
Minimum rating	52.9 (24.0)	35.2 (21.6)	<0.001	52.3 (24.2)	37.3 (22.0)	<0.001
Difference	16.2 (22.3)	17.5 (29.4)	0.757	15.5 (22.8)	23.4 (26.0)	0.031
Range	35.5 (22.6)	51.7 (22.7)	<0.001	35.9 (22.8)	51.0 (22.5)	<0.001
	%	%		%	%	
Rebound point present	44.1	83.0	<0.001	45.5	77.8	<0.001
Variable line	53.3	79.2	<0.001	54.5	73.3	0.016

Bolded values indicate significant differences between groups.

¹ Items from the PROMIS Pediatric Global Health survey (Forrest et al., 2014). Higher values reflect better health, with a range of 1 to 5.

² Standardized to the US general population of children, with a mean of 50.

³ Values from the timeline graph representing overall life quality, ranging from 0 (the worst it could be) to 100 (the best it could be) over the past year. Difference = (now - then); range = (maximum - minimum).

lower for youth reporting adversity compared to youth not reporting adversity (80.8 vs. 75.8), but there were no significant differences in mean “now” ratings by mental health challenge status. Conversely, mean timeline life quality ratings for the “then” point were significantly lower for youth reporting a mental health challenge compared to youth not reporting a mental health challenge (56.0 vs. 64.8); there were no significant differences in mean “then” ratings by adversity status.

In general, timeline ratings for overall life quality increased between the “then” and “now” timepoints, with a mean increase of 16.3 points over the year ($SD = 23.2$ points) on a 100-point scale. The mean increase over time for those describing a mental health challenge was 23.4 points, and this was significantly greater than the mean increase for those not reporting a mental health challenge. For the adversity and mental health challenge groups, the lowest point on the timeline for life quality ratings was significantly lower than their youth counterparts without adversity or mental health challenge. Similarly, the adversity and mental health challenge groups had a significantly higher within-individual range of ratings across the year.

Approximately half (48.7%) of youth drew a line that included one or more rebound points, reflected as a low point followed by a sharp increase on the timeline. Just over half (56.3%) drew a line that was coded as *variable*, as opposed to *flat and stable*, *flat and rising*, or *flat and falling*. Youth reporting some type of adverse experience or mental health challenge were significantly more likely to draw a timeline that was coded as *variable* and to indicate a rebound in the graph. Of the youth reporting an adverse experience in the past year, 79.2% drew a line coded as *variable* and 83.3% had one or more rebound points; of the youth reporting a mental health challenge in the past year, 73.3% drew a line coded as *variable* and 77.8% had one or more rebound points.

Discussion

In this study we examined participant-generated timelines as a strategy to explore youth perceptions of coping and well-being, with an aim to extend this activity into pediatric nursing practice and research. The results indicate that the timelining activity is brief, well-accepted, and readily understood by a community-based sample of healthy youth ages 8–17 years. The activity requires only paper and pencil and no special training for the administrator, though preparation as a nurse and experience in pediatrics likely supports engagement and sensitivity with youth in the activity. The interpretation of the characteristics of the line (variability and presence of a rebound) is intuitive and provides a starting point for further discussion with the participant about their thinking behind the drawing of the line. The follow-up interview, which prompts the youth to elaborate on their thoughts about the timeline, appears to orient the participant in time to the present, the past, and important experiences in the past year. Kolar et al. (2015) described a similar benefit to timelines, noting that “timelines help to focus a participant’s attention on the interview by acting as both a memory aid and a visual guide or map for how the interview will progress, as well as to situate responses within personal and structural contexts while highlighting important events in an individual’s life story” (p. 28). Spontaneous mention of perceptions that could be coded to resilience factors - notably endurance, group connectedness, and supportive relationships with peers - suggests that this activity may facilitate conversations about resilience without overtly asking about resilience. In research, the participant-generated timeline appears to be a useful and feasible tool for collecting qualitative and quantitative, time-based data that can be digitized and transformed for analysis with other data from both quantitative and qualitative sources. In practice with all youth, the activity could be used to facilitate a conversation about well-being or more specific topics such as adversity or mental health challenges that require an anchoring in time.

The variation in how youth depicted their life quality over time is worth further exploration. The timeline graph was not intended to represent a “true score” for quality of life, but rather offered the participants

a way to demonstrate the degree to which their life quality is perceived as variable over time and influenced by internal and external circumstances. The moderate correlation of the “now” rating with the general quality of life item on the PGH-7 may suggest that youth were thinking about “quality of life” differently in the timeline compared to the survey. As with previous studies of timelining, this activity likely supports a deeper, more temporally situated understanding of participants’ past experiences (Sheridan et al., 2011). The finding that half of the participants depicted one or more rebound points in the line suggests that the activity may be a way to access memories about challenging events with particular attention to the recovery or “bouncing back” from adversity. Szanton and Gill (2010) posited that resilience is a process that all individuals engage in as they progress through life, with three patterns of emergence from challenging circumstances: resistance, recovery, and rebound. These authors distinguish between recovery, which is the restoration of previous capacity after a challenge, and rebound, which reflects flourishing despite or because of challenges. Rebound, also known as posttraumatic growth, is the emergence after adversity in an improved state, having risen above the previous state of functioning (Szanton & Gill). We found that most youth rated their current life quality as higher than one year ago, regardless of (or perhaps because of) the circumstances in between. Future research should explore these distinctions between rebound and recovery, particularly as they relate to youth following adversity and/or mental health challenges.

The overall increase in timeline ratings between the “then” and “now” timepoints may reflect a phenomenon in the quality of life literature known as response shift. Response shift refers to changes in how an individual evaluates their quality of life over time due to shifts in meaning or conceptualization of what constitutes a good life (Rapkin & Schwartz, 2004). Rather than see this as a source of bias, Rapkin and Schwartz suggest that perception of life quality is dynamic over time as meanings and expectations shift through experience. Without actual longitudinal data for these youth, it is not possible from these data to determine *how* resilience factors influenced life quality perceptions in the moment. Youth with mental health challenges may use regulatory and meaning-making assets to frame present-day life quality more positively than in the past, as is seen in response shift. In contrast, those who experienced adversity as an acute challenge (such a death, serious illness, or traumatic experience) may have perceived the time before this experience more favorably. For these reasons, the timeline activity may be particularly useful to help youth articulate their appraisals of the temporality of life quality and the meanings they attribute to this trajectory. Timelining meets the call for new strategies to evaluate appraisals over time as alternatives to a one-size-fits-all approach, which is critical to advancing the science of quality of life measurement (Rapkin & Schwartz, 2004; Schwartz et al., 2017). Such interventions can support thriving after adversity by helping the individual mitigate the effect of stressors and recognize the coping skills that equipped them to rebound or “bounce back” after a challenge (Hamby, Taylor, et al., 2018; Kalisch & Kampa, 2021).

Supporting youth in understanding and communicating their perceptions of challenges, resources and assets reflects a rights-based, reflexive approach to resilience assessment in research and practice. Ethical practice requires understanding both the benefits and risks inherent in this activity. As a benefit, research that uses participatory visual activities with youth shifts the approach from doing research *about* youth to doing research *with* youth (Stewart-Tufescu et al., 2019). Stewart-Tufescu and colleagues observed that this type of task-based approach serves as a scaffold, enabling the interviewer and participant to go more deeply into the recollection of an experience. Kortegast et al. (2019) and Kesby (2000) have described a similar benefit of participatory visual methods: they allow the participant to uncover tacit knowledge, explore their subjective experiences, and create spaces for reflection with another. The participative role that the youth plays in both generating and interpreting their image is thus critical to the timelining experience (Guillemin & Drew, 2010).

A potential unintended consequence of this approach is the chance that a participant's lived experience would be obscured by the attempt to constrain it within a single line drawing. Snyder (2020) warned against placing too much meaning in a participant's drawing, or opening the door to traumatic experiences without recognizing the potential for unintended consequences. Engaging in this activity thus requires a clear understanding of the focus and goal for both the participant and the evaluator. We incorporated into the consent and assent processes for this study an explicit discussion of the rights of youth to choose the extent and duration of their participation in the activity. We also provided all participants with a resource handout and an encouragement to discuss their timelining experience with a trusted adult. The use of timelining and other participant-generated visual methods in research and practice with youth requires that the administrator approach the activity with respect for the individual and plan for responding to a range of emotional responses by the youth. For these reasons, the activity is particularly suited to nursing research and practice.

Finally, it is important to acknowledge that the timeline graph is not a true measure of life quality but rather a reflection of what the youth chose to report in the activity at that moment in time. Future studies need to incorporate additional measures of related constructs to more fully understand the potential for this activity in research and practice. The moderate associations of the timeline values with global health scores from the PGH-7 measure suggest that the timeline activity is assessing a construct similar to yet different from general wellbeing. Adding the notions of time and meaning to well-being assessment may capture nuances that standard survey measures are unable to measure. For this reason, mixed methods approaches that incorporate qualitative data are essential for moving the science of youth resilience forward in both research and practice (Ungar, 2019). Using a variety of tools and creative visual methods for understanding how people think about and make sense of their world offers fresh perspectives and advances the science (Barfield & Driessnack, 2018; Driessnack, 2006; Gauntlett & Holzwarth, 2006; Kortegast et al., 2019). Potential directions for research and practice are offered below.

Implications for practice and research

The American Academy of Pediatrics recommends that pediatric care includes resilience promotion and building on identified strengths "at almost every encounter" (Forkey et al., 2021, p. 7). The timelining activity may be useful in practice either as a brief activity or as a tool to facilitate more in-depth assessment. Engaging in a brief timelining activity with youth to open the conversation about strengths and coping may support trauma-informed care through a focus on resources, assets, and resilience at the child and family level. As a brief pediatric nursing intervention, the timeline activity may support youth in recognizing their own portfolio of strengths and adaptive coping strategies that support thriving in the context of normative and non-normative stressors. As a more in-depth tool for assessment, the timelining activity may be useful for providers with more time to engage in deep listening and therapeutic conversations about coping, self-efficacy, and resilience. According to Grych et al. (2015), the notion of *inoculation* suggests that exposure to challenges promotes the development of coping skills and coping self-efficacy that equip the individual to adapt to challenges later. As a function of resilience, prior experience with challenges provides a foundation for coping with adversity (Supkoff et al., 2011). Grych et al. (2015) hypothesize that an individual's resilience portfolio shapes how they respond to adversity through appraisals and coping, and that assets and resources have a moderating effect on well-being outcomes by reducing the impact of adversity. It is possible that as a pediatric nursing intervention in practice, the timeline activity could help youth appraise and engage assets and resources for coping more explicitly to support thriving after adversity.

The COVID-19 pandemic has affected all youth worldwide, and represents a shared adverse experience that pediatric nurses will need to

explore with youth in practice in the short and long term. As we discovered in this study, pandemic-related challenges were spontaneously mentioned by nearly two-thirds of youth in the timelining activity. The increased frequency of academic, peer, family, and mental health challenges mentioned in the 2021 cohort compared to the 2019 cohort mirror the recent literature on the pandemic's disruptive effects on children. These effects include impaired peer and family relationships (Ravens-Sieberer et al., 2021) and increased prevalences of depression, anxiety, and sleep disorders among youth (Ma et al., 2021). Participatory approaches such as the timelining activity in this study may support ongoing efforts in pediatric nursing practice to assess children's experience of the pandemic over time. Pediatric nurses might use this activity to engage youth in conversations about how they coped throughout the pandemic, with attention to the internal and external resources that supported thriving. The activity might also be useful as a family-based exercise to facilitate conversations about the shared family experience of living through the pandemic together.

There is evidence that engaging in positive activities such as recognizing adaptive coping, gratitude practices and self-affirmation can promote well-being and could be particularly protective for individuals with certain risk factors or mental health conditions (Layous et al., 2014). Future studies could focus on how youth would respond to the activity if it included a more targeted prompting to assess appraisals, perceived coping potential, and coping strategies that supported a rebound from challenging events in the recent past. These studies could incorporate mixed methods approaches that include measures from the Resilience Portfolio Questionnaire, which Hamby, Taylor, et al. (2018) have developed specifically for research with this model. Future studies could also use the timeline activity in repeated-measures studies with youth to test the hypothesis that density and diversity of strengths predict variance in subjective well-being, posttraumatic growth, and mental health symptoms *over and above* the presence of any particular strength (Hamby, Taylor, et al., 2018).

Limitations of the present study

The setting of this research may have limited depth of reflection for some participants. Reducing participants' experiences to timelines can limit the richness of reflection that may be generated through in-depth interviews (Berends, 2011). The setting and recruitment strategy necessarily limited the sample to youth who self-selected into the study, and the sample may therefore be biased for this reason. However, the sample was large and likely more representative than a clinical sample, and demographics of the sample indicate similarity to those of the state. To increase demographic diversity in our ongoing research in this area, we are expanding recruitment to rural sites to over-sample youth from under-represented groups. Social desirability bias could have played a role in how a line was drawn if the participant felt their friends or family members were observing them despite the study team's efforts to provide privacy. On the other hand, social desirability may be less likely in this activity since there is no "better" response to choose and there is no correct way to draw the line. Likewise, Caputo (2017) reported that social desirability tends to have a minimal role in assessments of subjective well-being.

Given the scope and setting of this study, we did not explore variations in appraisals and perceptions that may vary based on gender, culture, or the broader social context and structures. Because cultural contexts of resilience may vary, research and practice need to acknowledge the unmeasured variations in environment and social context that contribute to youth experience of resilience and well-being (Christmas & Khanlou, 2019; Ungar, 2019). We also did not explore developmental differences that may be present across age groups in this study. Grych et al. (2015) note that regulatory and meaning-making processes develop throughout childhood and into young adulthood, and at different rates inter-individually. Exploring the nuances and relative influence of

these developmental processes of resilience will be important in future research.

The COVID-19 pandemic influenced this research in a few ways. Data collection was halted in 2020 and then when it resumed in 2021, the context for interaction with participants was affected by the need for social distancing and masking. Enrollment was decreased in 2021 due to lower numbers of participants at the fair and the need to limit the number of people in the study booth at one time. In addition, the pandemic experience was a significant focus for many of the youth who participated in 2021, as reflected in the content of the interviews and the themes of challenges identified in the past year. For this reason, the pre-pandemic cohort and the post-pandemic cohort are unique in ways that likely were not fully captured in the analyses for this study.

Conclusion

The timelining activity is a feasible and well-accepted strategy to assess resilience in a community-based sample of youth. Participatory strategies such as timelining offer unique insights into youth perceptions of their well-being over time and may serve to extend findings from traditional survey assessments of assets and resources for well-being. The timeline activity and brief follow-up interview prompted many youth to express how resources and assets influenced their well-being. Using the Resilience Portfolio Model enabled the framing of youth comments according to aspects of the social ecology often neglected in research on adversity, such as mattering, and group connectedness (Hamby et al., 2019). For youth who experienced a significant stressor or mental health challenge in the previous year, a unique pattern of assets and resources were appraised as relevant to their resilience. For these youth, the timeline activity may prompt reflection on resources and assets that supported coping in the previous year, including supportive relationships and regulatory, interpersonal, and meaning-making assets that contribute to quality of life. Participant-generated timelines are therefore a valuable complement to resilience assessment in pediatric nursing practice and research.

Author note

This project was supported by funds from the University of Minnesota School of Nursing Foundation and the Cora Meidl Siehl Chair in Nursing Research for Improved Patient Care.

Credit authorship contribution statement

Wendy S. Looman: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Writing – original draft. **Donna J. Eull:** Data curation, Formal analysis, Investigation, Methodology, Writing – review & editing. **Adrianna N. Bell:** Data curation, Formal analysis, Investigation, Project administration, Resources, Writing – review & editing. **Tiffany T. Gallagher:** Data curation, Formal analysis, Investigation, Methodology, Writing – review & editing. **Paula V. Nersesian:** Data curation, Investigation, Writing – review & editing.

Declaration of Competing Interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pedn.2022.07.025>.

References

- Bagnoli, A. (2009). Beyond the standard interview: The use of graphic elicitation and arts-based methods. *Qualitative Research*, 9(5), 547–570. <https://doi.org/10.1177/1468794109343625>.
- Barfield, P. A., & Driessnack, M. (2018). Children with ADHD draw-and-tell about what makes their life really good. *Journal for Specialists in Pediatric Nursing*, 23(2) Article 12210 <https://doi.org/10.1111/jspn.12210>.
- Berends, L. (2011). Embracing the visual: Using timelines with in-depth interviews on substance use and treatment. *Qualitative Report*, 16(1), 1–9. <http://www.nova.edu/ssss/QR/QR16-1/berends.pdf>.
- Biglan, A., Flay, B. R., Embry, D. D., & Sandler, I. N. (2012). The critical role of nurturing environments for promoting human well-being. *American Psychologist*, 67(4), 257. <https://doi.org/10.1037/a0026796>.
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development. *Developmental Psychology*, 22(6), 723–742. <https://doi.org/10.1037/0012-1649.22.6.723>.
- Caputo, A. (2017). Social desirability bias in self-reported well-being measures: Evidence from an online survey. *Universitas Psychologica*, 16(2), 1–13. <http://doi.org/10.11144/Javeriana.upsy16-2.sds>.
- Castro, F. G., Kellison, J. G., Boyd, S. J., & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analyses. *Journal of Mixed Methods Research*, 4(4), 342–360. <https://doi.org/10.1177/1558689810382916>.
- Christmas, C. M., & Khanlou, N. (2019). Defining youth resilience: A scoping review. *International Journal of Mental Health and Addiction*, 17(3), 731–742. <https://doi.org/10.1007/s11469-018-0002-x>.
- Clatworthy, S., Simon, K., & Tiedeman, M. E. (1999). Child drawing: Hospital—An instrument designed to measure the emotional status of hospitalized school-aged children. *Journal of Pediatric Nursing*, 14(1), 2–9. [https://doi.org/10.1016/S0882-5963\(99\)80054-2](https://doi.org/10.1016/S0882-5963(99)80054-2).
- Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advances in mixed methods research designs. In A. Tashakkori, & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209–240). SAGE Publications.
- D2D (2020). Facilities. http://d2d.umn.edu/wp-content/uploads/2019/10/Facilities_2020.pdf.
- D'Amico, M., Denov, M., Khan, F., Linds, W., & Akesson, B. (2016). Research as intervention? Exploring the health and well-being of children and youth facing global adversity through participatory visual methods. *Global Public Health*, 11(5–6), 528–545. <https://doi.org/10.1080/17441692.2016.1165719>.
- Deguara, J. (2019). Young children's drawings: A methodological tool for data analysis. *Journal of Early Childhood Research*, 17(2), 157–174. <https://doi.org/10.1177/1476718X18818203>.
- Demerath, E., & Spector, L. (2021). *D2D Participant Demographics*. University of Minnesota. http://d2d.umn.edu/wp-content/uploads/2021/10/D2D_Demographics_2015-19.pdf.
- Driessnack, M. (2006). Draw-and-tell conversations with children about fear. *Qualitative Health Research*, 16(10), 1414–1435. <https://doi.org/10.1177/1049732306294127>.
- Duckworth, A. L., Steen, T. A., & Seligman, M. E. P. (2005). Positive psychology in clinical practice. *Annual Review of Clinical Psychology*, 1, 629–651. <https://doi.org/10.1146/annurev.clinpsy.1.102803.144154>.
- Forkey, H., Szilagyi, M., Kelly, E. T., Duffee, J., Springer, S. H., Fortin, K., ... Weber Zetley, L. (2021). Trauma-informed care. *Pediatrics*, 148(2) Article e2021052580. <https://doi.org/10.1542/peds.2021-052580>.
- Forrest, C. B., Bevans, K. B., Pratiwadi, R., Moon, J., Teneralli, R. E., Minton, J. M., & Tucker, C. A. (2014). Development of the PROMIS® pediatric global health (PGH-7) measure. *Quality of Life Research*, 23(4), 1221–1231. <https://doi.org/10.1007/s11136-013-0581-8>.
- Gauntlett, D., & Holzwarth, P. (2006). Creative and visual methods for exploring identities. *Visual Studies*, 21(01), 82–91. <https://doi.org/10.1080/14725860600613261>.
- Gonzalez-Mendez, R., Ramirez-Santana, G., & Hamby, S. (2021). Analyzing Spanish adolescents through the lens of the resilience portfolio model. *Journal of Interpersonal Violence*, 36(9–10), 4472–4489. <https://doi.org/10.1177/0886260518790600>.
- Grych, J., Hamby, S., & Banyard, V. (2015). The resilience portfolio model: Understanding healthy adaptation in victims of violence. *Psychology of Violence*, 5(4), 343–354. <https://doi.org/10.1037/a0039671>.
- Guillemin, M., & Drew, S. (2010). Questions of process in participant-generated visual methodologies. *Visual Studies*, 25(2), 175–188. <https://doi.org/10.1080/1472586X.2010.502676>.
- Hamama, L., & Ronen, T. (2009). Children's drawings as a self-report measurement. *Child & Family Social Work*, 14(1), 90–102. <https://doi.org/10.1111/j.1365-2206.2008.00585.x>.
- Hamby, S., Grych, J., & Banyard, V. (2018). Resilience portfolios and poly-strengths: Identifying protective factors associated with thriving after adversity. *Psychology of Violence*, 8(2), 172. <https://doi.org/10.1037/vio0000135>.
- Hamby, S., Taylor, E., Smith, A., & Blount, Z. (2018). *Resilience portfolio questionnaire manual: Scales for youth*. Life Paths Research Center. <http://doi.org/10.13140/RG.2.2.27296.74243>.
- Hamby, S., Taylor, E., Smith, A., Mitchell, K., Jones, L., & Newlin, C. (2019). New measures to assess the social ecology of youth: A mixed-methods study. *Journal of Community Psychology*, 47(7), 1666–1681. <https://doi.org/10.1002/jcop.22220>.
- Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, 42(2), 377–381. <https://doi.org/10.1016/j.jbi.2008.08.010>.
- Hays, R. D., Bjorner, J. B., Revicki, D. A., Spritzer, K. L., & Cella, D. (2009). Development of physical and mental health summary scores from the patient-reported outcomes

- measurement information system (PROMIS) global items. *Quality of Life Research*, 18 (7), 873–880. <https://doi.org/10.1007/s11136-009-9496-9>.
- Kalisch, R., & Kampa, M. (2021). Stressor appraisal as an explanation for the influence of extra- individual factors on psychological resilience. In M. Ungar (Ed.), *Multisystemic resilience: Adaptation and transformation in contexts of change* (pp. 135–152). Oxford Scholarship Online. <https://doi.org/10.1093/oso/9780190095888.003.0008>.
- Kesby, M. (2000). Participatory diagramming: Deploying qualitative methods through an action research epistemology. *Area*, 32(4), 423–435. <https://doi.org/10.1111/j.1475-4762.2000.tb00158.x>.
- Kolar, K., Ahmad, F., Chan, L., & Erickson, P. G. (2015). Timeline mapping in qualitative interviews: A study of resilience with marginalized groups. *International Journal of Qualitative Methods*, 14(3), 13–32. <https://doi.org/10.1177/160940691501400302>.
- Kortegast, C., McCann, K., Branch, K., Latz, A. O., Kelly, B. T., & Linder, C. (2019). Enhancing ways of knowing: The case for utilizing participant-generated visual methods in higher education research. *The Review of Higher Education*, 42(2), 485–510. <https://doi.org/10.1353/rhe.2019.0004>.
- Lampropoulou, A. (2018). Personality, school, and family: What is their role in adolescents' subjective well-being. *Journal of Adolescence*, 67, 12–21. <https://doi.org/10.1016/j.adolescence.2018.05.013>.
- Layous, K., Chancellor, J., & Lyubomirsky, S. (2014). Positive activities as protective factors against mental health conditions. *Journal of Abnormal Psychology*, 123(1), 3–12. <https://doi.org/10.1037/a0034709>.
- Layous, K., Sweeny, K., Armenta, C., Na, S., Choi, I., & Lyubomirsky, S. (2017). The proximal experience of gratitude. *PLoS One*, 12(7) Article e0179123 <https://doi.org/10.1371/journal.pone.0179123>.
- Literat, I. (2013). "A pencil for your thoughts": Participatory drawing as a visual research method with children and youth. *International Journal of Qualitative Methods*, 12(1), 84–98. <https://doi.org/10.1177/160940691301200143>.
- Ma, L., Mazidi, M., Li, K., Li, Y., Chen, S., Kirwan, R., & Wang, Y. (2021). Prevalence of mental health problems among children and adolescents during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders*, 293, 78–89. <https://doi.org/10.1016/j.jad.2021.06.021>.
- Malchiodi, C. A. (1998). *Understanding children's drawings*. Guilford Press.
- Medina-Muñoz, M., Chase, R., Roger, K., Loepky, C., & Mignone, J. (2016). A novel visual tool to assist therapy clients' narrative and to disclose difficult life events: The life story board. *Journal of Systemic Therapies*, 35(1), 21–38. <https://doi.org/10.1521/j Syst.2016.35.1.21>.
- Minnesota Department of Education (2021). *2020-21 enrollment* [Data set]. <https://public.education.mn.gov/MDEAnalytics/DataTopic.jsp?TOPICID=2>.
- Mitchell, M., Muftakhidinov, B., Winchen, T., & Trande, A. (2021). *Engauge digitizer (Version 12.1)* [Computer software]. GitHub. <http://markummitchell.github.io/engauge-digitizer/>.
- Noonan, R. J., Boddy, L. M., Fairclough, S. J., & Knowles, Z. R. (2016). Write, draw, show, and tell: A child-centred dual methodology to explore perceptions of out-of-school physical activity. *BMC Public Health*, 16(1). <https://doi.org/10.1186/s12889-016-3005-1>.
- Park, N., Peterson, C., & Seligman, M. (2004). Strengths of character and well-being: A closer look at hope and modesty. *Journal of Social and Clinical Psychology*, 23(5), 628–634. <https://doi.org/10.1521/jscp.23.5.628.50749>.
- Patterson, M. L., Markey, M. A., & Somers, J. M. (2012). Multiple paths to just ends: Using narrative interviews and timelines to explore health equity and homelessness. *International Journal of Qualitative Methods*, 11(2), 132–151. <https://doi.org/10.1177/160940691201100202>.
- PROMIS - Global Health (2017). Global health. http://www.healthmeasures.net/images/PROMIS/manuals/PROMIS_Global_Scoring_Manual.pdf.
- Puura, A., Puura, K., Rorarius, M., Annala, P., Viitanen, H., & Baer, G. (2005). Children's drawings as a measure of anxiety level: A clinical pilot study. *Pediatric Anesthesia*, 15(3), 190–193. <https://doi.org/10.1111/j.1460-9592.2005.01440.x>.
- Rapkin, B. D., & Schwartz, C. E. (2004). Toward a theoretical model of quality-of-life appraisal: Implications of findings from studies of response shift. *Health and Quality of Life Outcomes*, 2(1), 1–12. <https://doi.org/10.1186/1477-7525-2-14>.
- Ravens-Sieberer, U., Kaman, A., Erhart, M., Devine, J., Schlack, R., & Otto, C. (2021). Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *European Child & Adolescent Psychiatry*, 1-11. <https://doi.org/10.1007/s00787-021-01726-5>.
- Russo-Netzer, P., & Shoshani, A. (2020). Authentic inner compass, well-being, and prioritization of positivity and meaning among adolescents. *Personality and Individual Differences*, 167 Article 110248. <https://doi.org/10.1016/j.paid.2020.110248>.
- Sanglard, L. F., Oliveira, L. B., Massignan, C., Polmann, H., & De Luca Canto, G. (2022). Evaluating pain, fear, anxiety or stress/distress using children's drawings in paediatric dentistry: A scoping review. *European Archives of Paediatric Dentistry*, 23, 199–222. <https://doi.org/10.1007/s40368-021-00674-7>.
- Schwartz, C. E., Michael, W., & Rapkin, B. D. (2017). Resilience to health challenges is related to different ways of thinking: Mediators of physical and emotional quality of life in a heterogeneous rare-disease cohort. *Quality of Life Research*, 26(11), 3075–3088. <https://doi.org/10.1007/s11136-017-1633-2>.
- Sheridan, J., Chamberlain, K., & Dupuis, A. (2011). Timelining: Visualizing experience. *Qualitative Research*, 11(5), 552–569. <https://doi.org/10.1177/1468794111413235>.
- Snyder, J. (2020). Visualizing personal rhythms: A critical visual analysis of mental health in flux. *Proceedings of the 2020 ACM Designing Interactive Systems Conference* (pp. 269–281). <https://doi.org/10.1145/3357236.3395463>.
- Stewart-Tufescu, A., Huynh, E., Chase, R., & Mignone, J. (2019). The life story board: A task-oriented research tool to explore children's perspectives of well-being. *Child Indicators Research*, 12(2), 525–543. <https://doi.org/10.1007/s12187-018-9533-8>.
- Supkoff, L. M., Puig, J., & Sroufe, L. A. (2011). Situating resilience in developmental context. In M. Ungar (Ed.), *The social ecology of resilience* (pp. 127–142). Springer.
- Szanton, S. L., & Gill, J. M. (2010). Facilitating resilience using a society-to-cells framework: A theory of nursing essentials applied to research and practice. *Advances in Nursing Science*, 33(4), 329–343. <https://doi.org/10.1097/ANS.0b013e3181fb2ea2>.
- Tusaie, K., Puskar, K., & Sereika, S. M. (2007). A predictive and moderating model of psychosocial resilience in adolescents: Clinical scholarship. *Journal of Nursing Scholarship*, 39(1), 54–60. <https://doi.org/10.1111/j.1547-5069.2007.00143.x>.
- Ungar, M. (2011). Social ecologies and their contribution to resilience. In M. Ungar (Ed.), *The social ecology of resilience* (pp. 13–32). Springer.
- Ungar, M. (2019). Designing resilience research: Using multiple methods to investigate risk exposure, promotive and protective processes, and contextually relevant outcomes for children and youth. *Child Abuse and Neglect*, 96. <https://doi.org/10.1016/j.chiabu.2019.104098>.
- World Health Organization (2018). Mental health: Strengthening our response. <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>.