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Articulating the Trauma-Informed Theory of Behavior

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Abstract

Exposure to trauma increases the risk of engaging in detrimental health behaviors such as tobacco and substance use. In response, the United States Substance Abuse and Mental Health Services Administration developed Trauma-Informed Care (TIC), an organizational framework for improving the provision of behavioral health care to account for the role exposure to trauma plays in patients' lives. We adapt TIC to introduce a novel theory of behavior change, the Trauma-Informed Theory of Individual Health Behavior (TTB). TTB posits that individual capacity to undertake intentional health-promoting behavior change is dependent on three factors: 1) the forms and severity of trauma they have been and are exposed to; 2) how this trauma physiologically manifests (i.e., the trauma response); and 3) resilience to undertake behavior change despite this trauma response. We define each of these factors and their relationships to one another. We anticipate that the introduction of TTB will provide a foundation for developing theory-driven research, interventions, and policies that improve behavioral health outcomes in trauma-affected populations.

Keywords

Health Behavior Change; Trauma; Resilience; Stress; Theory; Adverse Childhood Experiences; General trauma exposure

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Introduction

Between 82% and 90% of people in the United States (US) are exposed to trauma in their lifetimes, including experiencing or witnessing violence and surviving war or a disaster (Kilpatrick et al., 2013; Koenen et al., 2017). This statistic, however, does not include exposure to traumatic environments, such as living in poverty (Gelkopf, 2018), nor the harms of historical trauma, such as forced enrollment in boarding schools for Indigenous children (Heart, 2003; Mohatt et al., 2014). Indeed, a growing body of evidence indicates that exposure to trauma is a critical risk factor for development of harmful health behaviors and poor health outcomes (Sowder et al., 2018). Exposure to trauma during childhood is associated with increased likelihood of cigarette smoking, alcohol and substance use disorders, sexual risk-taking, poor mental health, obesity, and greater incidence of heart disease, respiratory disease, and cancer in adulthood (Hughes et al., 2017). Notably, not all communities experience trauma equally. Racial, ethnic, sexual, and gender minority communities disproportionately experience acute forms of trauma (Merrick et al., 2018). Additionally, many groups are subject to additional identity-specific forms of historical trauma such as the history of genocide and forced assimilation faced by Indigenous people in the US (Heart, 2003; Mohatt et al., 2014). In 2019, exposure to trauma during childhood cost North America approximately $748 billion annually in direct medical costs and lost labor productivity (Bellis et al., 2019).

In response to the growing understanding of the role of trauma in influencing negative health behaviors, the US Substance Abuse and Mental Health Services Administration (SAMHSA) synthesized the Trauma-Informed Care (TIC) approach from the work of Harris and Fallot (2001) to achieve three primary goals within the behavioral health care context: “1) realiz[e] the prevalence of trauma; 2) recogniz[e] how trauma affects all individuals involved with the program, organization, or system, including its own workforce; and 3) respond by putting this knowledge into practice” (SAMHSA, 2014, p. xix). TIC informs the design and implementation of trauma-informed behavioral healthcare systems. It highlights the importance of patient recovery from experiences of trauma and protection from re-traumatization during treatment (SAMHSA, 2014).

TIC, however, does not provide an explicit theoretical framework explaining the mechanisms driving the relationship between trauma exposure and individual health behavior change. Generally, theories of individual health behavior are often critiqued for failing to effectively account for how individuals prioritize and enact behavior change (Kelly & Barker, 2016) and the effectiveness of interventions driven by such theories remains debated (Hagger & Weed, 2019). Of importance, most health behavior theories treat the individual as a “rational actor” without providing sufficient attention to the contextual factors that limit the range of choices available to a person (Kelly & Barker, 2016). As a result, they fail to capture the physiological, social, and structural factors which influence behavior. We posit that such health behavior theories fail to account for the ways in which individuals prioritize the need for potential behavior changes and the limited resources (e.g., time, energy) individuals have to address competing stressors. TIC addresses these shortcomings by acknowledging that 1) individuals tend to focus their efforts on the most immediate and severe threats in their lives (which often demand their attention) and that 2)

individuals generally undertake behaviors they believe will best alleviate the most immediate and severe of these threats (SAMHSA, 2014). Thus, integration of TIC principles into an individual-level theory of health behavior holds promise to improve the effectiveness of health behavior interventions.

The purpose of this paper is to introduce the Trauma-Informed Theory of Individual Health Behavior (TTB) and explain how its application can guide research on the mechanisms linking trauma and poor health outcomes. In particular, this theory is rooted in the understanding that exposure to trauma can lead to elevated stress responses (e.g., PTSD, anxiety) (van der Kolk, 2014) and that individuals make their best effort to address this response with limited resources. TTB acknowledges that the physiological response to trauma exposure often compels individuals to focus on alleviating the immediate harms and threats associated with this trauma. It is then hypothesized that, absent this physiological trauma response, individuals will be empowered to focus on the threat of the long-term health behaviors (e.g., diet, substance use) that are generally the focus of health behavior change interventions.

The Trauma-Informed Theory of Individual Health Behavior

The Trauma-Informed Theory of Individual Health Behavior (TTB, see Figure 1) is an extension of SAMHSA's TIC. The TTB theory: 1) identifies the primary forms that trauma can take; 2) models the pathways by which exposure to trauma inhibits individual capacity to undertake positive health behavior change (via the trauma response); and 3) identifies key resilience factors that can help individuals mitigate the trauma response.

Extending the TIC Definition of Trauma

TIC is an adapted version of the social-ecological model (SAMHSA, 2014). TIC identifies five social-ecological levels through which trauma occurs and exerts its effects, defined as individual, interpersonal, community/organizational, societal, and period of time in history (see Exhibit 1.1–2 in SAMHSA, 2014). The individual level of the TIC acknowledges that each person has a unique history of trauma exposure and a different capacity to mitigate the consequences of that trauma. At the interpersonal level, one person can directly inflict trauma upon another individual. At the community/organizational level, social networks and local organizations shape the environments within which individuals are exposed to trauma. A lack of social support may expose individuals to potentially traumatic environments. For example, an individual's risk of becoming homeless (a traumatic event) is shaped by the presence and ability of a family network to provide resources and protection from homelessness (Bramley & Fitzpatrick, 2018). Additionally, public safety and social service organizations may directly inflict harm on individuals. For example, the US Public Health Service conducted the 4-decades long Tuskegee Syphilis Study by recruiting Black men with syphilis, withholding their disease status, and pretending to provide them treatment despite the availability of effective treatment (Washington, 2006). At the societal level, state and federal laws and policies also shape the environments within which individuals are exposed to trauma. US federal policies passed in the 1990s, such as the 1996 Personal Responsibility and Work Opportunity Reconciliation Act and the 1998 Quality Housing

and Work Responsibility Act, prohibited individuals charged with substance use convictions from accessing federal housing and income assistance (Alexander, 2010), reinforcing their circumstances of poverty and housing insecurity. TIC also integrates historical context into the social-ecological model, given its importance in shaping individuals' experiences and environments over the long term. For example, Indigenous populations in the United States and Canada have been subjected to the trauma of centuries of genocide and assimilation policies (Heart, 2003). According to TIC, health care providers who fail to account for this history risk replicating these harms with their Indigenous patients (SAMHSA, 2014). These social-ecological levels are intertwined but differentiating them provides insight into pathways by which trauma is enacted and replicated on individuals.

Defining TTB Trauma Constructs

To facilitate replicability in measurement and targeted intervention, the TTB maps the TIC's five social-ecological levels onto three primary forms of trauma exposure. The individual and interpersonal levels map to **acute experiences of trauma**; the community/organizational and societal levels map to **trauma-replicating environments**; and period of time in history maps to **historical trauma** (see Figure 2). Below, we define each of these three forms of trauma.

Acute Experiences of Trauma—SAMHSA defines acute trauma as "an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or threatening and that has lasting adverse effects on the individual's functioning and physical, social, emotional, or spiritual well-being" (SAMHSA, 2014, p. xix). Acute traumatic events can take a variety of forms, such as experiencing assault or losing one's home or employment. They are frequently defined by an accompanying loss of sense of safety, autonomy, and trust. In these moments, an individual is subject to direct harm at the hands of another individual or entity (such as a landlord or employer) in an interpersonal context. As shown in Figure 2, in the TTB, acute experiences of trauma encompass the "individual" and "interpersonal" social-ecological levels of the TIC. We also note that much of the research on the harms of trauma exposure focus on the impact of such exposure during childhood on health behaviors and outcomes during adulthood (Hughes et al., 2017). This definition of acute trauma is intended to encompass both traumas experienced during childhood and adulthood and can be understood to measure the lifetime accumulation of traumatic exposure.

Trauma-Replicating Environments—Trauma-replicating environments impact individuals in two ways: 1) they prime individuals to anticipate a traumatic event (i.e., they are "triggering"), regardless of whether such trauma will occur; and, 2) they may expose individuals to acute experiences of trauma (SAMHSA, 2014). With the former, this "priming" represents a distinct harm that such environments enact on individuals and is partially dependent upon previous exposure to trauma. For example, individuals who have experienced or witnessed abusive behavior from law enforcement may find the presence of law enforcement to be "triggering", as they anticipate potential abuse. The latter emphasizes the inextricable link between individuals' environments and the acute forms of trauma they experience within those environments. This construct captures how social circumstances

and environments, such as poverty or homelessness, similarly replicate experiences of trauma. Coates and Mckenzie-Mohr (2010) describe how, for homeless youth, becoming homeless represents an event of acute trauma and that the circumstances of being homeless continuously replicate that loss of safety and autonomy (Coates & McKenzie-Mohr, 2010). Poverty creates a similar cycle, where the experience of living in poverty continually replicates the dynamics of acutely experiencing trauma. Poverty is not simply defined by a lack of resources, but by the threat of trauma in the forms of housing, food, and financial insecurity and loss. As put by Gelkopf (2018, p. 2) (2018), "trauma begets trauma, trauma begets poverty, poverty begets poverty, poverty begets trauma, and the cycle goes on" (Gelkopf, 2018). Trauma-replicating environments overlay the "societal" and "community/organizational" social-ecological levels of the TIC (Figure 2).

Historical Trauma.: Mohatt et al. summarize historical trauma as "a complex and collective trauma experienced over time and across generations by a group of people who share an identity, affiliation, or circumstance" (2014, p. 128). They go on to describe three components of historical trauma: "a 'trauma' or wounding; the trauma is shared by a group of people, rather than individually experienced; the trauma spans multiple generations, such that contemporary members of the affected group may experience trauma-related symptoms without having been present for the past traumatizing events" (Mohatt et al., 2014, p. 128). Historical trauma overlays the "period of time in history" social-ecological level of the TIC. This outermost layer represents the historical context of the current moment, which "influences each other level" (SAMHSA, 2014, p. 16). Historical harms are concentrated within specific communities that share a collective history and the burden of these harms is passed from generation to generation (Heart, 2003; Mohatt et al., 2014). For example, in the US, the enslavement and disenfranchisement of Black people and, in the US and Canada, the genocide of Indigenous people are not historical relics. The health of Black communities today cannot be separated from enslavement, from the failures of Reconstruction, from Jim Crow, from redlining and racist housing policies, and from the War on Drugs policies that have led to the US mass incarceration crisis (Alexander, 2010). Similarly, the health of North American Indigenous communities today cannot be separated from the massacre of people, from the seizure of homelands, and from the stealing and forced assimilation of children during the boarding/residential school era (Elias et al., 2012; Heart, 2003).

The Trauma Response.—In the face of imminent danger, it is natural for the body to invoke its protective stress responses. However, as van der Kolk (2014, p. 66) writes, "as long as trauma is not resolved, the stress hormones that the body secretes to protect itself keep circulating and the defensive movements and emotional responses keep getting replayed". Trauma responses are unique to the individual, their environments, and the circumstances of their trauma. Trauma responses manifest in myriad variations that cannot easily be boiled down to standardized classifications (van der Kolk, 2014). Until the trauma response is properly addressed, individuals are subject to reliving their experiences of trauma and this reliving "engrave[s] those memories [of trauma] ever more deeply in the mind" (van der Kolk, 2014, p. 67). This experience then acts to disconnect individuals from the present and their immediate surroundings (i.e., dissociation) and their "physical reactions are dictated by the imprint of the past" (van der Kolk, 2014, p. 67). TIC notes that, for

individuals experiencing such a trauma response, their actions must be understood as a best effort to escape the cause of the trauma (as the stress system in their body is dictating) (SAMHSA, 2014). The trauma response activates the body's survival mechanisms. In this state of stress, survival becomes the primary concern and represents a primary barrier to engaging with behavior changes to achieve long-term health outcomes. Additionally, there are many instances where behaviors known to be detrimental in the long-term are used to cope with the trauma response. In such cases, survival takes priority, and the trauma response provides a physiological imperative for the individual to prioritize their immediate safety concerns over potential long-term health consequences. This is consistent with findings that indicate that higher and prolonged stress levels are associated with negative health behaviors and outcomes, such as increased cigarette smoking, poor diet, lack of physical activity, and diminished physical, mental, and spiritual well-being, generally (Clark et al., 2016; Ng & Jeffery, 2003; Park & Iacocca, 2014; Umberson et al., 2008). The TTB includes a trauma response construct to ensure it is appropriately accounted for in trauma-related research endeavors.

Resilience Factors

From TIC, four key resilience factors which mediate the relationship between trauma and health behaviors are included in the TTB: *safety*, *autonomy*, *trauma awareness,* and *trust* (SAMHSA, 2014). The TTB defines resilience as an individual's capacity to cope with and mitigate the effects of the trauma response over time. Resilience should not be thought of as an individual attribute, but as a process in which an individual adapts to deleterious exposure to maintain a basal level of well-being (Lerner et al., 2013; Southwick et al., 2014). While an individual's trauma response is shaped by their exposure to trauma, an individual's capacity to undertake health promoting behaviors is shaped, in part, by their resilience. This understanding of health behavior highlights an important concept in trauma-informed approaches: an individual's risk of adopting poor health behaviors, such as cigarette smoking, and their ability to change such behaviors are related to their capacity to avoid exposure to trauma and to manage the sequelae of traumatic experiences and environments. Resilience factors are specific, measurable constructs which influence individual capacity to cope with and mitigate the trauma response. TIC notes that for health care providers to deliver more effective care, the impact of trauma must first be addressed (SAMHSA, 2014). Based on the forms of trauma defined above, this means that providing effective care is dependent first on addressing the present harms that acute experiences of trauma, trauma-replicating environments, and historical trauma are enacting on individuals (see Figure 1). As such, interventions aiming to utilize TTB should understand resilience building as secondary to addressing exposure to trauma.

Safety—TIC identifies the creation of a "safe environment" as necessary to providing adequate behavioral health care (SAMHSA, 2014). "Safety" refers to an individual's perception that they are not currently at risk of nor actively being subjected to traumatizing events and that they feel protected from the sequelae of having experienced trauma (SAMHSA, 2014). Such an understanding of safety also requires provider and individual awareness of "triggers" which elicit a trauma response and decrease an individual's perception of safety (SAMHSA, 2014). If an individual feels unsafe, their capacity to

undertake behavioral change is reduced as a consequence of their trauma response. As van der Kolk (2014) states, “traumatized people chronically feel unsafe inside their bodies: the past is alive in the form of gnawing interior discomfort” (van der Kolk, 2014, p. 96).

Autonomy—TIC identifies fostering individual autonomy as a necessary step to providing adequate behavioral health care (SAMHSA, 2014). “Autonomy” refers to an individual’s perception that they have control over themself and the environment around them – that they have agency over their life (van der Kolk, 2014). A lack of control over one’s surroundings or of one’s own body is a defining characteristic of traumatic experiences (SAMHSA, 2014; van der Kolk, 2014); a loss of autonomy can trigger and reinforce the trauma response.

Trauma Awareness—Body awareness and autonomy are inextricably linked. Van der Kolk notes that “agency starts with…our awareness of our subtle sensory, body based feeling: the greater that awareness, the greater our potential to control our lives” (van der Kolk, 2014, p. 95). Being aware of internal feelings allows an individual to “feel in charge of [their] body, [their] feelings, and [their] self” (van der Kolk, 2014, p. 96). Often, individuals experiencing a trauma response are not conscious of the connection between their current state of elevated stress and past experiences of trauma (Payne et al., 2015). Becoming conscious of this connection – such as through elevating interoceptive and proprioceptive awareness (Payne et al., 2015) – can provide individuals a sense of agency over their own body, which represents a necessary step to overcoming the trauma response (van der Kolk, 2014). Mindfulness exercises, such as body scan and breathing exercises, represent a potential set of interventions which can improve awareness of the body and its internal sensations (Creswell, 2017).

Trust—TIC identifies that health care providers must be aware of the trauma their patient population has faced and must understand that, for trauma survivors, their behaviors are often a response to mitigating the harms of experienced trauma (SAMHSA, 2014). The inverse of this principle is that patients must trust their health care providers (or whoever is asking them to enact behavior change). The trauma response is often defined by not being able to trust one’s self or others (van der Kolk, 2014). This is in line with research finding that decreased trust in health care systems and providers is associated with diminished communication, care retention and poor health care outcomes (Cuevas et al., 2019).

The primary goal of improving safety, autonomy, trauma awareness, and trust is to help individuals overcome the trauma response and avoid future exposure to trauma. These resilience factors are inextricable and are related to a person’s ability to overcome the impact of trauma on their life. Importantly, increased resilience positively affects patients’ readiness to make positive behavior changes (Cook et al., 2017). Further, we recognize that there are additional factors which are understood to influence resilience, such as social support, and encourage future research into TTB to expand upon these initial resilience factors adapted from TIC principles. TTB emphasizes, though, that enhancing individual resilience is understood as a secondary intervention to eliminating trauma exposure.

TTB Pathways Defined

TTB applies these three forms of trauma and four resiliency factors to understand how they relate to health behaviors (see Figure 1). TTB is comprised of three components: trauma and its response; resilience to mitigate the trauma response; and individual capacity to undertake positive health behaviors. First, we can understand the trauma response an individual may face in making behavior change as dependent on their past exposure to trauma. Historical trauma can influence how trauma is acutely experienced, can shape trauma-replicating environments, and can have direct impact on the trauma response. Acute experiences of trauma shape the individual's reactions to different types of environments that an individual is exposed to and define the environments that are trauma-replicating for an individual. The acute experiences of trauma also directly impact the trauma response. Exposure to trauma-replicating environments then has a direct impact on the trauma response but can also be understood to modify the relationship between historical trauma and acute experiences of trauma with the trauma response. For example, lifting an individual out of trauma-replicating environments may attenuate the harmful impacts that historical trauma and acute experiences of trauma have. As such, TTB-informed interventions can aim to improve health behavior outcomes through two pathways: first, by decreasing exposure to trauma and, thus, attenuating the trauma response; and second, by improving individual resilience to overcome the trauma response. It is important to understand, however, that individual resilience is defined by access to limited personal resources and that interventions which focus solely on resilience building will likely fail individuals who face the greatest burden of exposure to trauma. TTB is based on the TIC principle that individuals will always make their best effort to alleviate the harms they are currently facing (SAMHSA, 2014). TTB views trauma reduction as the most effective strategy for motivating health behavior change, with resilience building as an important (though secondary) mitigation strategy.

Discussion

Here we have presented a novel trauma-informed theory of health behavior, the Trauma-Informed Theory of Individual Health Behavior. Exposure to trauma is responsible for disparate health harms and billions of dollars in medical costs each year (Bellis et al., 2019). As highlighted by SAMHSA's development of Trauma-Informed Care, stakeholders have mobilized initiatives to better understand and intervene on the damaging impact of trauma on behavioral health. The development of TTB builds upon this important work, providing an explicit model for how trauma impacts an individual's ability to undertake beneficial behavioral change.

TTB and theories of behavior change

Whereas health behavior theories traditionally aim to promote specific health behavior changes, TTB provides a framework for understanding how individuals prioritize responding to harms they have been, are, and will be exposed to. The TTB does not model the relationship between the individual and any specific behavior – this should not be viewed, necessarily, as a short-coming, but instead as a key feature. This key feature arises from a core tenet of TIC, that individuals will make their best effort to overcome their most immediate stressors. Individuals may not be able to take advantage of interventions

aimed at specific long-term health behaviors when exposed to trauma. Not only is this conceptualization useful in contrasting the perceived immediacy the threat of trauma holds in comparison to, for example, the long-term harms of cigarette smoking or poor diet, but it also implies that if those long-term harms are the most immediate threat to an individual's well-being, then they will do their best to address it.

We may look to smoking cessation to highlight this key difference. An intervention based on theories such as the Theory of Planned Behavior (TPB) seeks to improve knowledge and change attitudes abouts the harms of cigarette smoking to incentivize cessation (Glanz et al., 2008). While this approach can help an individual make an informed decision about the relative threat of cigarette smoking, it does not consider whether an individual will perceive the long-term harms of cigarette smoking as a more immediate concern than other sources of harm. TTB assumes that the individual is best equipped to prioritize addressing sources of harm they are exposed to, which may explain why cigarette smoking prevalence remains disparately high among populations subject to more immediate threats to well-being, such as those subject to financial, food, and housing insecurity or those living with elevated levels of psychological distress (i.e., a potential proxy for an elevated trauma response) (Cornelius et al., 2020). Interventions based on Social Cognitive Theory (SCT) focus on how a behavior change is learned and on promoting self-efficacy for behavior change (e.g., teaching youth how to say no to cigarettes and promoting their confidence to do so) (Glanz et al., 2008). TTB is not concerned with how a behavior is learned or an individual's belief in their ability to undertake it but is instead intended to reflect on how trauma physiologically influences the behavioral choices an individual will prioritize. SCT's understanding that there is a dynamic interaction between person, environment, and their behavior (i.e., reciprocal determinism) is consistent with TTB. This similar understanding of the relation between the individual, their environment, and their behavior suggests that TTB and SCT may be used effectively in conjunction with one another. However, SCT rejects the idea that an individual's behavior is determined solely by their environment. TTB, on the other hand, suggests that environmental exposure to trauma can dictate individual behavior via an elevated trauma response. As such, TTB differs from many health behavior theories because it is focused on how people prioritize behaviors, whereas theories such as TPB and SCT focus on how behaviors are chosen, learned, and executed.

TTB also differs from the Transactional Model of Stress and Coping (TMSC), which explains how individuals cope in response to stressors, including trauma (Glanz et al., 2008). Similar to TTB, TMSC models how external/environmental stressors and individual capacity to cope with these stressors impact individual capacity to undertake behavior change (Glanz et al., 2008). Both theories suggest that the individual's ability to overcome stressors is subject to the individual's limited set of resources to do so. A primary difference is that TMSC is concerned with the *cognitive* pathway by which stressors are appraised and a coping strategy is developed to adapt to said stressor (Glanz et al., 2008). In contrast, TTB models the relationship between exposure to stressors and the *physiological* response they invoke in the individual. TMSC presumes the rational actor conception of human behavior, in that it posits that when exposed to a given situation, an individual will undertake a cognitive appraisal and evaluate the harms and benefits, both in the short- and long-term (Glanz et al., 2008). TTB suggests that, when exposed to trauma, an individual's response

may be largely *physiological* and that the cognitive pathways described by TMSC may be more applicable in circumstances where the trauma response is minimal.

TTB may best be understood as an individual-level counterpart to participatory community-level frameworks such as the Empowerment Education model developed from the ideas of Paolo Freire (Wallerstein, 1993). Empowerment Education is an action-oriented model in which community members critically engage with their shared social conditions through group dialogue, which then motivates actions to alter their social conditions for the benefit of the community (Wallerstein, 1993). TTB models how individuals experience social conditions and how these conditions impact individuals' capacity to undertake behavior changes. Further, TTB, like Empowerment Education, emphasizes that no one can speak better to the health needs of an individual than the individual.

We additionally note limitations to the scope of TTB. The theory is not concerned with individual knowledge, beliefs, or attitudes toward given health behaviors, nor does it address how behaviors are learned and executed. As discussed in relation to TPB and SCT, TTB implies that an elevated trauma response may inhibit an individual from prioritizing adopting a health behavior related to a long-term harm, rendering knowledge, beliefs, and attitudes relatively moot. However, it will be important to better understand the role that knowledge and attitudes play in influencing health behavior when considered through the lens of TTB – for example, it is worth considering if increased knowledge or improved self-efficacy about health behaviors supports individual resilience. Additionally, as we have noted, the TTB resilience factors are limited to individual characteristics, whereas community and cultural factors such as social support (Ozbay et al., 2007) and cultural resilience (Spence et al., 2016) have been identified as important protective factors. Finally, while TTB is concerned with the role of trauma exposure in eliciting a physiological trauma response, TTB does not reflect on the biological mechanisms that may underly the trauma response such as the epigenetic component of the human stress response (Stankiewicz et al., 2013). TTB-driven research which utilizes biometrics to operationalize the trauma response could provide a better understanding the pathways by which exposure to trauma impact health behavior.

Future directions

TTB could motivate research addressing health behavior disparities. Frohlich and Potvin describe "The Inequality Paradox", a phenomenon in which population-level public health approaches improve health metrics overall, but reinforce pre-existing health disparities (2008). They point out that while many public health initiatives, such as North American tobacco control, improve population-level behavioral health indicators, they also further concentrate risk within vulnerable communities (Frohlich & Potvin, 2008). To date, trauma-informed research and interventions have largely focused on exposure to trauma during childhood development on a wide range of health behaviors during adulthood (such as cigarette and other drug use) and outcomes (such as heart disease and cancer) (Hughes et al., 2017). By applying TTB, we can understand how trauma experienced by marginalized communities subjects them to concentrated health risks and health outcome disparities. Examining historical trauma provides a lens through which to understand how specific communities, such as Black and Indigenous people in North America, face increased

barriers to making specific behavioral health choices. Examining trauma-replicating environments provides a lens through which to understand how specific demographics – such as those living in poverty, those without health insurance, and those who are houseless – face increased barriers to undertaking specific behavioral health promoting choices.

TTB may be very well suited to understand behavioral health disparities in the time of COVID-19. We may understand the COVID-19 pandemic as a traumatic event and, further, as reinforcing existing historical harms and trauma-replicating environments. The impacts of the epidemic have not been felt equally in the US, with lower-income, communities of color already facing the syndemic harms of historical trauma and chronic health inequities (Gravlee, 2020). The epidemic has not been solely defined by risk of contracting the disease, but by increased risk of housing, economic, and health care insecurity. For many, the COVID-19 era has been defined by both the acute trauma of more severe illness and greater cumulative loss and the reinforcement of trauma-replicating environments. Further, these harms have thus far been concentrated in many US populations, such as Indigenous and Black communities, that have been subject to well-documented historical harms. As such, TTB is well-suited to examine the impact of the COVID-19 epidemic on health behaviors and related disparities.

Conclusion

In line with the broader efforts to better understand the harmful health impacts of trauma exposure, we present the novel Trauma-Informed Theory of Individual Health Behavior. TTB holds the potential to help researchers and policymakers better understand and intervene on the harms of trauma, and to ultimately support the development of interventions to reduce health behavior disparities. A primary implication of TTB is that health practitioners and agencies promoting behavior changes to address specific health harms (especially long-term health consequences, such as cigarette-related outcomes) must account for the role of competing stressors and sources of more immediate harm individuals are also facing – specifically indicating that alleviating the conditions of trauma-replicating environments (such as poverty, homelessness, and lack of access to healthcare) may be necessary steps to addressing health disparities faced by individuals living in these environments. Next steps should aim to apply and evaluate the validity and utility of TTB as a research framework.

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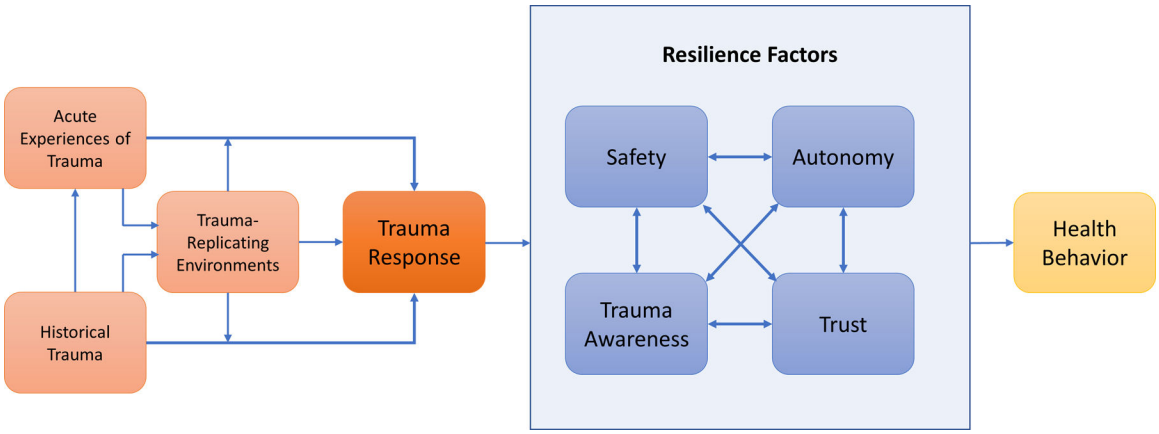

Figure 1.
The trauma-informed theory of behaviour

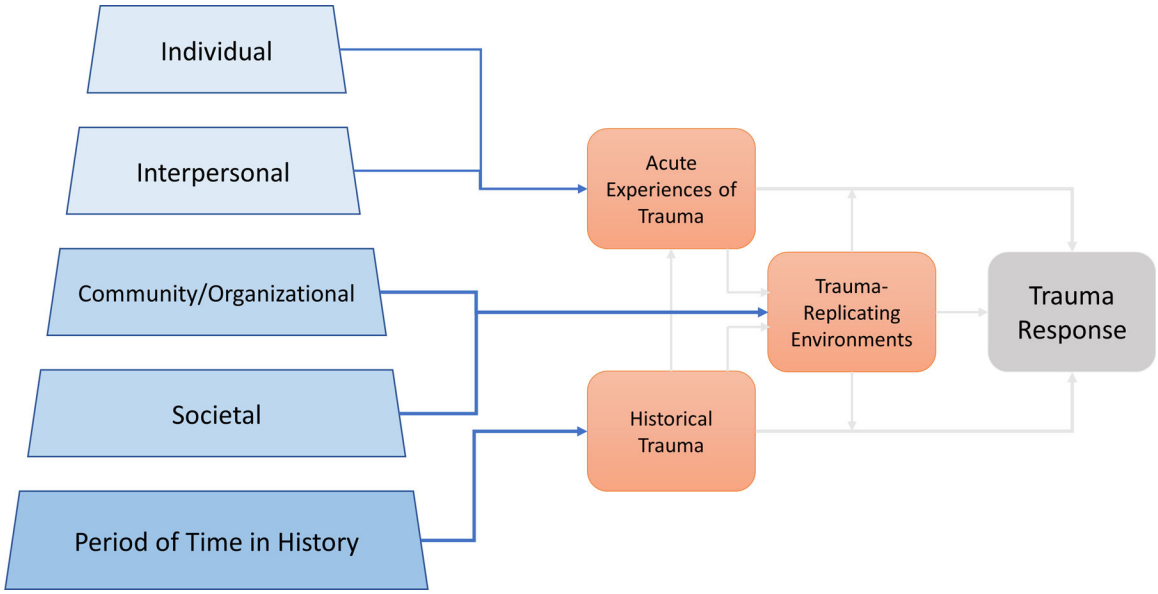

Figure 2.

TIC social–ecological levels mapped onto TTB trauma constructs. TIC, Trauma-Informed Care; TTB, Trauma-Informed Theory of Individual Health Behavior.