



Published in final edited form as:

J Clin Child Adolesc Psychol. 2023 ; 52(2): 184–195. doi:10.1080/15374416.2021.1923020.

Youth trauma histories are associated with under-diagnosis and under-treatment of co-occurring youth psychiatric symptoms

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Abstract

Objective: We examined whether in the presence of trauma exposure, non-traumatic stress-related symptoms are interpreted by mental health clinicians as less salient than the trauma exposure and are de-emphasized as a treatment target, consistent with a diagnostic overshadowing bias.

Methods: Using an adapted version of a diagnostic overshadowing bias experimental paradigm, mental health clinicians ($N = 266$, M age = 34.4 years, 82% female) were randomly assigned to receive two of six clinical vignette variations. Vignette 1 described an adolescent with obsessive-compulsive disorder (OCD). Vignette 2 described a pre-adolescent with oppositional defiant disorder (ODD). Vignettes were identical except for whether the youth reported exposure to a potentially traumatic event (PTE; no PTE, sexual PTE, or physical PTE). Clinicians received one vignette with a PTE and one without, counterbalancing order. Clinicians rated the likelihood the youth met criteria for various diagnoses and the appropriateness of various treatments on 7-point scales.

Results: Across both vignettes, clinicians rated the target diagnosis (OCD in Vignette 1, ODD in Vignette 2) as less likely for vignettes with a PTE than for the same vignettes without a PTE. Clinicians also rated evidence-based treatment modalities for target diagnoses as less appropriate in the presence of a PTE than when a PTE was present.

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Conflicts of Interest: Dr. Beidas discloses that she receives royalties from Oxford University Press and has consulted for Camden Coalition of Healthcare Providers. All other authors have no conflict of interest to disclose.

Conclusions: Consistent with possible bias, clinicians may under-recognize and under-treat non-traumatic stress-related mental health symptoms in youth with a co-occurring trauma history. Future work to validate this bias in real-world practice is indicated.

Keywords

youth mental health; clinician bias; assessment; evidence-based treatment

Accurate diagnosis of psychiatric conditions is critical for identifying appropriate evidence-based treatments for individuals (Jensen-Doss & Weisz, 2008; Youngstrom et al., 2017) yet diagnostic errors are high within community settings (Liang et al., 2006; Marchand et al., 2006; Park et al., 2018). Clinician biases and heuristics often interfere with the diagnostic process, potentially driving diagnostic errors (Blumenthal-Barby & Kreiger, 2015). This is concerning because misdiagnosis may lead to youth receiving mismatched treatment practices, preventing them from receiving appropriate evidence-based interventions. This study investigated the potential role of a *trauma-related diagnostic overshadowing bias* in mental health diagnosis and treatment selection for youth. Specifically, we aimed to identify whether youth endorsement of exposure to a potentially traumatic event (PTE) biases mental health clinicians towards: (1) interpreting non-traumatic stress-related psychiatric symptoms as less salient than the trauma exposure, and (2) de-emphasizing these non-traumatic stress-related symptoms as a treatment target.

A diagnostic overshadowing bias refers to clinicians' under-recognizing or under-treating psychiatric symptoms when an individual patient has a co-occurring, seemingly more salient condition (Levitan & Reiss, 1983; Reiss et al., 1982). Specifically, this bias purports that highly salient conditions can *overshadow* co-occurring, unrelated mental health conditions that may warrant treatment, leading to the underdiagnosis and/or undertreatment of these co-occurring conditions. Originating in the developmental disabilities literature, the diagnostic overshadowing bias is most often studied amongst clinicians working with individuals with intellectual disabilities. A robust series of analogue studies using clinical vignette-based methodology demonstrate that when clinicians are randomized to identical patient vignettes that vary only whether or not the patient has an intellectual disability, clinicians less accurately diagnose mental health conditions for the patient in the vignette when the patient is said to have an intellectual disability compared to when they do not (e.g., Levitan & Reiss, 1983; Mason & Scior, 2004; Reiss et al., 1982; Spengler & Strohmer, 1994; Wood & Tracey, 2009). Similar vignette-based studies also suggest that clinicians are less likely to indicate that they would provide treatment for the co-occurring psychiatric conditions in the presence of an overshadowing condition compared to when the overshadowing condition is absent (Goldsmith & Schloss, 1986; Jones et al., 2008). While this bias is most commonly assessed via analogue clinical vignette methodology, it has been validated through chart reviews (e.g., Hendriksen et al., 2015), and qualitative research with clinicians (Donner et al., 2009; van Nieuwenhuizen et al., 2013; Shefer et al., 2014), patients, and their caregivers (Clarke et al., 2007; Weiss et al., 2009), lending support for the findings of the vignette-based paradigm to translate to clinical practice. Since the initial identification of the diagnostic overshadowing bias in the treatment of individuals with intellectual disabilities, this bias also has been theorized and documented to occur in other highly salient conditions, such as substance

use (Williams et al., 2020), autism spectrum disorder (Kerns et al., 2015; Trubanova et al., 2014), attention-deficit hyperactivity disorder (Hendricksen et al., 2015), and schizophrenia (Yakovenko et al., 2016).

PTE exposure, common among youth who present for treatment in community settings (Walrath, et al., 2006), may be uniquely salient to clinicians working with youth in community settings, especially given national efforts to implement trauma-informed and trauma-based systems of care (e.g., Amaya-Jackson et al., 2018), leading to a possible trauma-related diagnostic overshadowing bias (hereafter referred to as a TDOB) effect. However, this has not been studied to date. While the mechanisms by which an individual develops symptoms of post-traumatic stress are multifactorial, trauma-related disorders are the only psychiatric conditions with a known *precipitating event*. Cognitive science literature indicates that humans are innately drawn to seek causal explanations for complicated scenarios (Bender & Beller, 2019), with a preference for simpler explanations and the fewest number of causal explanations (Lombrozo, 2007). A bias toward causal cognition may contribute to clinicians attributing symptoms of ambiguous etiology to a PTE as a single causal factor for all symptoms, rather than symptoms of another psychiatric condition or a complex interplay of traumatic stress and co-occurring conditions. Thus, exposure to trauma may contribute to diagnostic errors for non-trauma related psychiatric conditions that warrant treatment. A TDOB would be present if: (1) clinicians interpret non-traumatic stress related symptoms as less salient and significant when a youth reports exposure to a PTE relative to when a youth with identical symptoms does not, and (2) clinicians rate evidence-based treatments for the non-traumatic stress related symptoms as less appropriate for the youth in the presence of a PTE than in its absence.

A TDOB would have important implications for clinical practice. While the importance of screening and assessing for PTEs cannot be understated (Center for Substance Abuse Treatment, 2014): (1) not all youth with PTEs require trauma treatment, and (2) youth who exhibit symptoms of post-traumatic stress may also present with more pressing comorbidities that require non-trauma-focused treatment. The detrimental clinical consequences of misdiagnosis for trauma-exposed youth include mislabeling a child as “traumatized,” preventing youth from receiving treatment for co-occurring symptoms, and increasing treatment drop-out risk (Babbar et al., 2018; Wamser-Nanney, 2020). For youth experiencing significant post-traumatic stress symptoms, accurate identification of comorbid conditions that warrant treatment is also critical, as youth with non-trauma related comorbidities (e.g., externalizing behaviors, anxiety disorders) are at high-risk for dropping out of trauma-based treatment (Eslinger et al., 2012; Sprang et al., 2013; Wamser-Nanney & Steinzor, 2016).

We examined the presence of a TDOB among mental health clinicians via an established vignette-based experimental paradigm derived from the diagnostic overshadowing bias literature (Levitan & Reiss, 1983; Reiss et al., 1982; Reiss & Szysko 1983). We hypothesized that clinicians would exhibit a TDOB across two distinct clinical vignettes describing youths presenting for mental health treatment. We used two clinical vignettes to examine the pervasiveness of the TDOB across clinical presentations (e.g., internalizing versus externalizing symptoms), given that this is the first effort to examine whether a

TDOB effect exists. Vignette 1 described an adolescent female with obsessive-compulsive disorder (OCD). Vignette 2 presented a pre-adolescent male with oppositional defiant disorder (ODD). As detailed below, we adapted the most concise version of the paradigm to assess the extent to which the presence or absence of a PTE influences clinician ratings of diagnostic and treatment appropriateness for youth psychiatric symptoms. Because youth can present with a wide range of PTEs, and because certain PTEs (e.g., sexual trauma) may be more salient to clinicians than other PTEs (e.g., physical trauma; Jakob et al., 2017), we also varied the PTE type (sexual vs. physical trauma) in our clinical vignettes to examine the consistency of a potential TDOB effect across trauma types.

A secondary exploratory aim of this study was to identify whether clinician training background (i.e., if the clinician had received formal training in trauma treatment) moderated a TDOB. As a TDOB may contribute to youth receiving insufficient or inappropriate mental health treatment, learning if or how prior training mitigates or exacerbates this bias would have important implications for training and supporting clinicians working with youth who have PTE exposure. In the larger diagnostic overshadowing literature, there is mixed evidence for the potential moderating role of clinician background and experience to mitigate the impact of bias, with some studies suggesting no influence of prior clinical experience (Goldsmith & Schloss, 1986; Reiss & Szysko 1983) and others suggesting that a clinician's background may mitigate bias (Hinde et al., 2020; Mason & Scior, 2004). Given this, we did not posit directional hypotheses for this secondary aim.

Methods

Participants

Participants were 266 mental health clinicians recruited through email distribution lists and professional listservs. We intentionally recruited from trauma-focused listservs to oversample clinicians with exposure to trauma-focused treatments. Respondents averaged 34.4 years old ($SD = 10.04$) and were predominantly female (82%). Respondents most commonly worked in community mental health (40%), with diverse representation from: hospitals (16%), private practice (16%), schools (9%), and other (e.g., homeless shelters, residential treatment, integrated primary care; 15%); 4% did not disclose work setting. Most participants had a master's degree (67.7%; 22.6% doctorate, 6% bachelor's) and came from diverse mental health disciplines (35.3% social work; 30.5% clinical psychology; 20.7% counseling; 3.8% marriage and family therapy; 5.3% other [e.g., school psychology]; 1% indicated they preferred not to disclose).

Many (70.7%) clinicians endorsed previous training in evidence-based practices for trauma, with most (56%) endorsing training in trauma-focused cognitive behavioral therapy (TF-CBT). However, only 29.7% reported that they had received relatively extensive training (i.e., either an in-person or online workshop *and* receipt of either clinical supervision or outside consultation in the model). Overall, clinicians in this sample reported moderate to high confidence ratings (1 = *Not at All Confident* to 10 = *Extremely Confident*) in their ability to treat anxious/depressed youth ($M = 6.78$), trauma-exposed youth ($M = 6.75$), and youth with externalizing behaviors ($M = 5.97$).

Procedure

In the simplest version of the traditional experimental paradigm for intellectual disabilities, clinicians are randomly assigned to receive one of two case vignettes (Levitan & Reiss, 1983). Both describe a patient with a constellation of psychiatric symptoms likely to meet diagnostic criteria for a psychiatric condition (e.g., depression, anxiety). Vignettes are identical, except that in the first, the patient is identified as having an intellectual disability and in the second, the patient is noted to be of average intelligence. Clinicians rate the likelihood the patient meets criteria for the psychiatric condition described and report the likelihood that they would deliver various treatments to the individual. Each disorder and treatment modality is rated separately on a Likert scale from 1 (*Not at all Likely*) to 7 (*Extremely Likely*). An overshadowing bias is considered present when clinicians report a lower likelihood of the patient meeting criteria for the psychiatric condition in Vignette 1 (intellectual disability) relative to Vignette 2 (no intellectual disability) and report a lower likelihood of delivering treatment for the co-occurring psychiatric condition. Whether clinicians rate the patient as more likely to meet criteria for an intellectual disability in Vignette 1 relative to Vignette 2 is not considered germane to the presence of the bias, as clinicians can rate multiple diagnoses as equally likely. This design has been widely utilized to assess diagnostic overshadowing bias (Jopp & Keys, 2001).

We adapted the paradigm by varying vignettes by the presence or absence of *PTE exposure* for two separate case vignettes: one of an adolescent female with OCD (internalizing) symptoms and one of a pre-adolescent male with ODD (externalizing) symptoms. As noted above, we intentionally used two separate vignettes that varied whether the clinical symptoms represented an internalizing or externalizing condition to examine the potential consistency of a TDOB effect across distinct clinical presentations. We selected these specific mental health conditions because both have clear, front-line psychosocial treatment modalities: exposure and response prevention (ERP) for OCD (e.g., Franklin et al., 2015) and parent management training (PMT) for ODD (e.g., Kaminski & Claussen, 2017).

Each vignette detailed a prototypical case that might present in a community setting (see Appendix). Prior to study implementation, vignettes were reviewed by two experts in trauma-based community mental health care who provided feedback to enhance the case's authenticity and ensure that the PTE intensity was equivalent across vignettes. Importantly, in all vignettes that included a PTE, psychiatric symptoms were deliberately reported to have onset prior to the PTE. PTE information was placed in the middle of the vignette to avoid an anchoring effect (Woodward et al., 2009). We extended the paradigm to examine the possible influence of trauma type, resulting in three variations for each vignette (six variations total): case descriptions in which the youth denied any PTE, the youth endorsed a physical PTE, or the youth endorsed a sexual PTE.

Prior to recruitment, we conducted an *a priori* power analysis to determine our target recruitment size. Power analysis indicated that a sample size of 50 clinicians per vignette variation would produce 80% power to detect a small effect ($f^2=.18$) for the presence of a TDOB and a small to medium effect to detect moderators ($f^2=.24$). After consenting, clinicians were randomly assigned to receive two of the six vignettes, so that each clinician received one with a PTE and one without; we also varied whether clinicians received a

vignette in which the PTE was physical or sexual. We counterbalanced PTE presentation order. This resulted in four conditions:

- Condition 1: Vignette 1 - no PTE, Vignette 2 - physical PTE
- Condition 2: Vignette 1 - no PTE, Vignette 2 - sexual PTE
- Condition 3: Vignette 1 - physical PTE, Vignette 2 - no PTE
- Condition 4: Vignette 1 - sexual PTE, Vignette 2 - no PTE

This resulted in the following sample sizes for each vignette variation (see Table 1): Vignette 1: no PTE $n = 134$, sexual PTE $n = 69$, physical PTE $n = 63$; Vignette 2: no PTE $n = 132$, sexual PTE $n = 64$, and physical PTE $n = 70$.

After each vignette, clinicians rated the likelihood that the youth met criteria for various psychiatric diagnoses on 7-point Likert scales (1 = *Not at all Likely* to 7 = *Extremely Likely*). Questions were identical for both vignettes. For each vignette, clinicians were asked to rate the likelihood that the youth met criteria for the *target diagnosis* (OCD in Vignette 1, ODD in Vignette 2), and two trauma-related disorders: post-traumatic stress disorder (PTSD), and adjustment disorder. Clinicians were also asked to rate the diagnostic likelihood of several distractor diagnoses: attention-deficit/hyperactivity disorder (ADHD), major depressive disorder (MDD), and no diagnosis. Clinicians had the option to select “*I don’t know enough about this diagnosis to answer*” for all diagnoses. As each disorder is rated separately on a Likert scale for “how likely the patient is to meet criteria for [*diagnosis*], clinicians can theoretically indicate that both the co-occurring target diagnosis and the trauma-related disorder are co-primary presentations. A TDOB would be considered present only if clinicians report a *lower* likelihood of the youth meeting criteria for the target diagnosis in the presence of a PTE than when there is no PTE.

In addition to rating the diagnostic likelihoods, we were also interested in understanding the impact of the presence or absence of a PTE on how clinicians would rate the appropriateness of various treatment models. For each vignette, clinicians were asked to rate the appropriateness of the *target treatment modality* (ERP in Vignette 1, PMT in Vignette 2), and the appropriateness of *TF-CBT* (for trauma-related symptoms) for the youth’s clinical presentation on a similar 7-point Likert scale (1 = *Not at All Appropriate* to 7 = *Extremely Appropriate*). Clinicians also were asked to rate the clinical appropriateness of several distractor treatments: habit reversal training and play therapy. Clinicians had the option to select “*I don’t know enough about this intervention to answer*” for all treatment modalities. A TDOB would be considered present only if clinicians reported *lower* ratings of clinical appropriateness of the target treatment modality for the youth in the presence of a PTE compared to when there is no PTE.

As an alternative method for assessing the potential impact of a PTE on clinical decision-making, clinicians were also asked two “forced-choice” questions for each vignette. Clinicians were first asked to select the diagnosis they perceived *most* likely to be the primary diagnosis for the youth in the vignette; second, clinicians were asked to select the treatment modality they felt was most clinically appropriate for the youth. Clinicians completed these questions after providing the 7-point likelihood and appropriateness ratings.

Additional Measures.—Clinicians also reported on demographic (age, gender) and clinical background characteristics (degree, licensure status, professional discipline), and whether they had received prior training in trauma treatment (“*Have you previously received training in trauma-focused therapy?*”). Clinicians who endorsed prior trauma training were asked to indicate the format of this training (e.g., in person workshop, online workshop, receipt of expert consultation, receipt of clinical supervision from someone trained in the treatment model). Clinicians who endorsed receiving either in person or online training *and* either expert consultation or clinical supervision were classified as having received “extensive training” for analysis.

Ethical Considerations.—All clinicians completed informed consent prior to participation. The survey was created and distributed using Qualtrics. Participants received a \$10 electronic gift card for participating. Procedures were approved by the Institutional Review Board at the University of Pennsylvania.

Analysis Plan.—Prior to analysis, data were cleaned and screened. Preliminary analyses included analysis of variance (ANOVA) and chi-square analyses to compare clinicians across the randomized groups on demographic and clinical background characteristics as a randomization check.

The potential presence of a TDOB was examined in four ways. Our primary analyses, consistent with the original paradigm, utilized ANOVA (with post-hoc Tukey’s contrasts in the presence of a significant omnibus *F* test) to examine whether clinicians responding to vignettes that included a sexual PTE or physical PTE rated the youth as *less likely* to meet criteria for the psychiatric condition of interest (i.e., the target diagnosis; OCD in Vignette 1, ODD in Vignette 2) than clinicians who received the same vignettes without a PTE. Second, to examine the potential effect of PTE presence or absence on treatment modality selection, ANOVA (with post-hoc Tukey’s contrasts in the presence of a significant omnibus *F* test) examined whether clinicians responding to vignettes with a PTE rated the target treatment modality (i.e. ERP in Vignette 1, PMT in Vignette 2) as less appropriate for the youth than clinicians who received a vignette that had no PTE. Third and fourth, we conducted analyses using the “forced-choice” questions; chi-squared analyses examined whether the primary diagnosis and most clinically appropriate treatment model selected by clinicians in the forced-choice questions varied based on whether the vignette they received included a sexual PTE, a physical PTE, or no PTE.

Finally, for our exploratory test of whether clinician training background in trauma treatment moderated the TDOB, factorial ANOVA examined the effect of formal trauma training (any training in trauma treatment and extensive training in trauma treatment) on clinician ratings of diagnostic and treatment appropriateness.

Given the number of analyses performed, we selected a conservative α level of .01 for all analyses. Effect sizes for ANOVA were evaluated using partial η^2 and were interpreted using standard conventions: small effect $\eta^2 = .01$; medium effect $\eta^2 = .06$; large effect $\eta^2 = .14$. Effect sizes for follow-up contrasts examining mean differences between PTE conditions were evaluated with Cohen’s *d*, using conventional guidelines, and were

interpreted as follows: small effect $d = 0.2$; medium effect $d = 0.5$; large effect $d = 0.8$. (Cohen, 1988).

Results

Preliminary Analyses

Missing value analysis indicated variables were missing <10% data. There were no group differences in clinician gender, age, degree, licensure status, professional discipline, or training in trauma treatment between conditions, indicating successful randomization (all p s > .05).

Presence of a Trauma-Related Diagnostic Overshadowing Bias (TDOB).

Table 1 shows the results of ANOVA and follow-up contrasts for Vignettes 1 and 2. Table 2 shows the results of the forced choice chi-squared analyses for Vignettes 1 and 2. Analyses are presented separately for each vignette.

Vignette 1: Adolescent female with OCD.—Omnibus results for Vignette 1 were significant for the Vignette 1 target diagnosis (OCD; $F_{(2, 258)} = 13.87, p < .001$, partial $\eta^2 = .10$, a medium effect), indicating that clinician diagnostic ratings varied as a function of PTE status, consistent with hypotheses. Follow-up Tukey's contrasts indicated that the primary effect was for the presence of a sexual PTE; clinicians rated the presence of OCD as significantly less likely in vignettes with a sexual PTE ($M = 4.90$) than vignettes with no PTE ($M = 6.00$; $p < .001$; Cohen's $d = 0.72$, a medium effect). There was no difference in target diagnosis ratings by clinicians when rating a vignette with a physical PTE ($M = 5.73$) compared to no PTE ($M = 6.00, p = .414$). There were significant mean differences in ratings that contained a physical versus sexual PTE, with clinicians rating the presence of the target diagnosis as less likely in the presence of a sexual PTE relative to a physical PTE ($p = .003$; Cohen's $d = 0.52$, a medium effect).

Omnibus results for Vignette 1 also indicated a significant effect of a TDOB for treatment modality, with appropriateness ratings for the target treatment modality (ERP) varying as a function of PTE status ($F_{(2, 237)} = 10.86, p < .001, \eta^2 = .08$, a medium effect). Again, follow-up Tukey's contrasts indicated that the primary effect was for the presence of a sexual PTE; clinicians rated the target treatment as significantly less appropriate in vignettes with a sexual PTE ($M = 4.21$) than vignettes with no PTE ($M = 5.52$; $p < .001$; Cohen's $d = 0.66$, a medium effect). There was no difference in target treatment modality appropriateness ratings by clinicians for vignettes with a physical PTE ($M = 5.24$) versus vignettes with no PTE ($M = 5.52$; $p = .600$). There were also significant mean differences between vignettes containing a physical versus sexual PTE, with clinicians rating the target treatment as less appropriate in the presence of a sexual PTE relative to a physical PTE ($p = .006$; Cohen's $d = 0.53$, a medium effect).

Consistent with expectations, clinicians rated a PTSD diagnosis differentially as a function of PTE status ($F_{(2, 245)} = 58.69, ps < .001$, partial $\eta^2 = .10$, a large effect). Clinicians were equally likely to rate PTSD as a likely diagnosis regardless of whether the PTE type was a sexual PTE ($M = 5.49$) or a physical PTE ($M = 4.85$; $p = .07$); both PTE types were

associated with higher likelihood ratings of PTSD compared to no PTE ($M = 2.97$, $ps < .001$; Cohen's d sexual PTE vs no PTE = 1.61; Cohen's d physical vs no PTE = 1.17, large effects). Also consistent with expectations, clinicians differentially rated the appropriateness of TF-CBT as a function of PTE presence ($F_{(2, 247)} = 55.69$, $p < .001$ partial $\eta^2 = .31$, a large effect). Clinicians were equally likely to rate TF-CBT as an appropriate treatment regardless of whether the PTE type was a sexual PTE ($M = 5.78$) or a physical PTE ($M = 5.03$; $p = .05$); both PTE types were associated with higher appropriateness ratings of TF-CBT compared to no PTE ($M = 3.09$, $ps < .001$; Cohen's d Sexual PTE vs no PTE = 1.60; Cohen's d Physical vs no PTE = 1.00, large effects). Clinicians were marginally likely to differentially rate the likelihood of the client meeting criteria for an Adjustment Disorder as a function of PTE status, but this was not significant at our conservative α level ($F_{(2, 239)} = 3.25$, $p = .04$).

In the forced choice questions (Table 2), 91.7% of clinicians endorsed the target diagnosis (OCD) as the primary diagnosis in the absence of a PTE; significantly fewer endorsed OCD as the primary diagnosis when the vignette included a PTE (Physical PTE = 56.5%; Sexual PTE = 44.9%; $X^2_{(6)} = 67.32$, $p < .001$). Similarly, 65.4% endorsed the target treatment (ERP) as the most appropriate treatment for vignettes without a PTE; significantly fewer endorsed ERP as the most appropriate treatment when the vignette included a PTE (Physical PTE = 38.7%; Sexual PTE = 18.8%; $X^2_{(10)} = 82.82$, $p < .001$). As seen in Table 2, rates of PTSD as the primary diagnosis and TF-CBT as the most appropriate treatment were higher in the PTE conditions. Interestingly, 12% of clinicians who rated the vignette with *no PTE* endorsed TF-CBT as the most appropriate treatment.

Vignette 2: Pre-adolescent male with ODD.—Omnibus results for Vignette 2 were significant for the Vignette 2 target diagnosis (ODD; ($F_{(2, 245)} = 21.98$, $p < .001$, partial $\eta^2 = .15$, a large effect), consistent with hypotheses. Follow-up Tukey's contrasts indicated that target diagnosis ratings were lower in the presence of both a sexual PTE ($M = 3.85$) and a physical PTE ($M = 4.71$) when compared to no PTE ($M = 5.53$; both $ps < .001$; Cohen's d Sexual PTE vs No PTE = 0.98; Cohen's d Physical vs No PTE = 0.52, medium and large effects, respectively). Clinicians were marginally more likely to rate the target diagnosis as less likely in the presence of a sexual PTE when compared to a physical PTE, although the findings were not significant at our conservative α level ($p = .046$).

Omnibus results for Vignette 2 also indicated a marginal effect of a TDOB for treatment modality, with appropriateness ratings for the target treatment modality (PMT) varying as a function of PTE status with a small effect. However, the findings were not significant at our conservative α level ($F_{(2, 230)} = 4.43$, $p = .013$, $\eta^2 = .04$, a small effect), so no post-hoc analyses were conducted.

Consistent with expectations, clinicians rated a PTSD diagnosis differentially as a function of PTE presence ($F_{(2, 243)} = 280.72$, $p < .001$, partial $\eta^2 = .70$, a large effect). Clinicians were equally likely to rate PTSD as a likely diagnosis regardless of whether the PTE type was a sexual PTE ($M = 5.83$) or a physical PTE ($M = 5.58$; $p = .562$); both PTE types were associated with higher likelihood ratings of PTSD compared to no PTE ($M = 1.76$, $ps < .001$; Cohen's d Sexual PTE vs No PTE = 3.12; Cohen's d Physical vs No PTE = 2.89, large

effects). Also consistent with expectations, clinicians differentially rated the appropriateness of TF-CBT as a function of PTE status ($F_{(2, 246)} = 211.31, p < .001$ partial $\eta^2 = .63$, a large effect). Clinicians were equally likely to rate TF-CBT as an appropriate treatment regardless of whether the PTE type was a sexual PTE ($M = 6.02$) or a physical PTE ($M = 5.89; p = .874$); both PTE types were associated with higher appropriateness ratings of TF-CBT compared to no PTE ($M = 2.21, ps < .001$; Cohen's d Sexual PTE vs No PTE = 2.64; Cohen's d Physical vs No PTE = 2.56; large effects). Clinicians did not differentially rate the likelihood of the client meeting criteria for an Adjustment Disorder in Vignette 2 as a function of PTE status ($F_{(2, 237)} = 1.99, p = .14$).

Results of the forced choice questions (Table 2) showed a similar pattern. Sixty-eight percent of clinicians endorsed the target diagnosis (ODD) as the primary diagnosis in the absence of a PTE; significantly fewer endorsed ODD as the primary diagnosis when the vignette included a PTE (Physical PTE = 28.8%; Sexual PTE = 17.5%; $X^2_{(12)} = 118.57, p < .001$). Similarly, 53.8% endorsed the target treatment (PMT) as the most appropriate treatment in vignettes with no PTE; significantly fewer endorsed PMT as the most appropriate treatment when the vignette included a PTE (Physical PTE = 16.9%; Sexual PTE = 14.3%; $X^2_{(10)} = 111.85, p < .001$). As seen in Table 2, rates of PTSD as the primary diagnosis and TF-CBT as the most appropriate treatment were higher in the PTE conditions.

Clinician Training as a Moderator of TDOB

Any Trauma Training.—Factorial ANOVA indicated that there were no main effects of trauma training or interactions between the presence of a PTE and whether or not clinicians had any trauma training with how clinicians rated diagnostic likelihood of OCD ($F_{\text{main}(1, 245)} = .001, p = .98; F_{\text{interaction}(1, 247)} = 0.71, p = .49$) and treatment appropriateness of ERP ($F_{\text{main}(1, 224)} = .35, p = .56; F_{\text{interaction}(2, 224)} = .67, p = .52$) in Vignette 1 or diagnostic appropriateness of ODD ($F_{\text{main}(1, 237)} = 1.81, p = .18; F_{\text{interaction}(2, 237)} = 0.75, p = .58$) and treatment appropriateness of PMT ($F_{\text{main}(1, 222)} = 3.14, p = .08; F_{\text{interaction}(1, 222)} = .118, p = .47$) in Vignette 2.

Extensive Trauma Training.—Similarly, when trauma training was examined comparing clinicians who had received more extensive trauma treatment training (i.e., had attended either an in-person or online workshop *and* had received either clinical supervision or outside consultation in the model), there were no main effects or interactions on how clinicians rated the diagnostic likelihood of OCD ($F_{\text{main}(1, 245)} = 0.003, p = .96; F_{\text{interaction}(2, 245)} = 0.98, p = .38$) and treatment appropriateness of ERP ($F_{\text{main}(1, 244)} = 5.91, p = .02; F_{\text{interaction}(2, 244)} = 2.44, p = .09$) in Vignette 1 or treatment appropriateness of PMT ($F_{\text{main}(1, 222)} = 0.83, p = .36; F_{\text{interaction}(2, 222)} = 1.61, p = .20$). There was a main effect of more extensive trauma training, such that clinicians without extensive training generally rated the diagnostic likelihood of ODD higher than clinicians who did have extensive training, regardless of the presence of a PTE ($F_{\text{main}(1, 237)} = 8.11, p = .005$). However, there was no interaction with trauma type ($F_{\text{interaction}(2, 237)} = 1.79, p = .17$).

Discussion

This vignette-based study is the first to suggest that clinicians may underdiagnose and undertreat non-trauma related psychiatric symptoms in youth with a PTE. Results supported our hypothesis that a TDOB may exist that potentially impacts both clinician diagnostic and treatment-decision-making. Furthermore, findings were generally consistent across two distinct clinical vignettes, supporting the existence of a TDOB for both internalizing and externalizing conditions. In general, there was also initial support for the idea that a sexual PTE may drive or amplify a TDOB effect, possibly because sexual PTEs can be perceived as more salient than physical PTEs (Jakob et al., 2017). Specifically, clinicians receiving a vignette describing an adolescent female with OCD symptoms rated the youth as less likely to meet diagnostic criteria for OCD and less likely to benefit from front-line treatment for OCD (ERP) when the youth presented with a sexual PTE than clinicians who rated the same vignette without a PTE or a physical PTE. Clinicians who received a vignette describing a pre-adolescent male with ODD symptoms rated the youth less likely to meet ODD criteria when the vignette contained any PTE (sexual or physical) compared to clinicians whose vignette did not. Clinicians were marginally more likely to rate the male youth as less appropriate for PMT when the vignette contained any PTE compared to no PTE, although this finding was not significant at our conservative alpha level.

Importantly, the presence of a physical PTE seemed to function differently in the vignette describing a teenage Black female with OCD compared to the vignette of a pre-teen Hispanic male with ODD, although the same general pattern of effects was observed. Specifically, in the former vignette, the presence of a physical PTE was not associated with a TDOB effect, whereas it was for the male with ODD. While the nature of our design does not allow us to parse apart whether this is due to diagnostic, age, gender, or racial/ethnic differences across the vignettes, it raises the possibility that youth demographic characteristics interact with a TDOB effect. For example, it is possible that physical aggression against a younger child compared to a teenager may be perceived as more salient and potentially traumatic and therefore likely to influence a TDOB. Alternatively, physical aggression toward Black youth may be interpreted as less damaging or traumatic relative to youth of other racial or ethnic backgrounds, perhaps due to a perception that violence in Black communities is the norm (Gaylord-Harden et al., 2011; Ng-Mak et al., 2002). Future work to explore these and other potential hypotheses for demographic moderators of the TDOB is needed.

Secondary aims were to determine whether a clinicians' prior trauma training experience moderated TDOB magnitude. Results of these analyses did not suggest that prior trauma training (either any training or more extensive training) was related to the magnitude of the TDOB. While more work is needed to understand the extent to which trauma training efforts may exacerbate or ameliorate a possible TDOB, these findings highlight the possible pervasiveness of this bias regardless of clinician training. It will be important for future work to examine more nuanced moderators, such as more exact dosage of training (e.g., half day workshops vs. intensive trainings; Frank et al., 2020) or the type of trauma treatment modality to fully assess this.

A TDOB has implications for supporting clinicians to deliver evidence-based care. Routine screening for PTEs is critical for ensuring that all youth in need of trauma-based services receive appropriate, evidence-based care. However, screening, particularly in the absence of routine screening for other psychiatric conditions, may exacerbate a TDOB, placing youth with psychiatric conditions unrelated to trauma at-risk for misdiagnosis and under-treatment. While clear guidelines for determining the relative priority and sequencing of treatment targets in psychotherapy for youth with complex comorbidities are underdeveloped (Park et al., 2015), strong training in evidence-based assessment and case conceptualization may help mitigate this bias. Additionally, behavioral economics strategies (e.g., leveraging social norms, heuristics, restructuring incentives) have successfully enhanced accurate clinical decision-making in medicine (Cho & Bates, 2018). Developing heuristic strategies or decision-support tools to guide evidence-based case conceptualization may be helpful. For example, a mnemonic such as **C**onsider **T**rauma **O**verall for **E**veryone might guide clinicians to consider the *Course* of symptoms within the context of the *Timing* of trauma-exposure, and the *Onset* or *Exacerbation* of symptoms within the context of routine screening.

This area is ripe for research. First, additional work is needed to validate the TDOB, either through chart review or standardized patient interactions, and link individual clinician performance in the analogue vignette scenarios to direct clinical practice. This is critical for determining both exactly how a TDOB impacts clinical practice to determine how to optimize interventions to mitigate diagnostic bias. Second, this study was not designed to explain why clinicians exhibit this bias. Future work exploring hypotheses for this trauma-specific manifestation of a diagnostic overshadowing bias will be important for understanding causality and informing potential intervention. One hypothesis, as described earlier, is that complex psychiatric conditions have a multifactorial etiology, with no clear “cause.” As humans are innately drawn to seek causal explanations (Bender & Beller, 2019), a bias toward causal cognition and parsimonious explanations (Lombrozo, 2007) may contribute to the TDOB through clinicians attributing symptoms of ambiguous etiology to a PTE. A second hypothesis is that the TDOB is an unintended side effect of widespread efforts to implement trauma-informed and trauma-based systems of care across the nation (e.g., Amaya-Jackson et al., 2018). These efforts typically include a focus on routine PTE screening to identify youth experiencing post-traumatic stress symptoms and training clinicians to deliver trauma-specific treatments (Berliner & Kolko, 2016). Our finding that a portion of clinicians endorsed TF-CBT as the most appropriate clinical treatment for youth in vignettes in which the youth denied experiencing any PTE may provide some support for this hypothesis. This also is consistent with emerging work that suggests that not all youth receiving trauma-specific treatments in community settings are experiencing significant post-traumatic stress symptoms (e.g., Babbar et al., 2018). Future research is needed to understand any intersections with system-level trauma-focused implementation efforts and a TDOB.

To inform intervention design to mitigate bias, additional work on moderators (e.g., training type, youth characteristics) is needed. Notably, Black youth are exposed to PTEs at disproportionately high rates relative to White youth (Drake et al., 2009), which increases

their risk for more comorbid psychiatric symptoms (Hicks et al., 2020). Black youth also are more likely to be inappropriately or under-treated for psychiatric issues (Fante-Coleman & Jackson-Best, 2020). Future work examining how race may interact with the TDOB could be an important step for addressing racial biases in mental healthcare. Finally, designing clinician-targeted interventions to address this bias (e.g., case conceptualization education, mnemonic tools), enhance clinician diagnostic accuracy, and improve selection of appropriate treatments for youth in routine clinical settings is an important next step.

Results should be interpreted in the context of study limitations. Our primary limitation is reliance on a vignette-based paradigm to quantify the TDOB. While using an established experimental paradigm that has been associated with real-world clinical effects is a strength, findings may not generalize to or predict an individual's clinical practice. Future work should examine whether a TDOB influences direct clinical assessment and treatment practices (e.g., via chart review, standardized patients) and if clinician performance in the vignette-paradigm predicts their actual clinical practice. Second, we adapted the paradigm. While consistency in findings across the vignettes supports the validity of findings, replication with independent samples is needed. Third, as noted above, because we manipulated PTE type only, we could not examine reasons for the slightly different results across the two vignettes, which differed by youth gender, age, and race. Similarly, our forced choice items did not allow clinicians to select co-primary diagnoses or treatment modalities. While these items primarily served to corroborate findings from the Likert scale items, future work would benefit from integrating more options in forced choice question stems. Finally, our recruitment method was intentionally designed to sample for clinicians with a trauma background; however, this method also had limitations. Most notably, we were unable to calculate a formal response rate for the number of clinicians who received recruitment materials for the study but declined to participate, nor were we able to examine how the characteristics of our sample compared to the full population of trauma clinicians.

This study also had notable strengths. This work builds on a robust literature demonstrating the potential for a diagnostic overshadowing bias to influence clinical decision-making and extends it to the novel application of pediatric trauma. Additional strengths include our use of a randomized design in a relatively large sample of practicing mental health clinicians. Most importantly, this is the first study to suggest the potential for a youth's trauma exposure to bias clinician diagnostic and treatment decision-making, pointing to a number of exciting future directions.

Conclusion

Results provide evidence that a trauma-related diagnostic overshadowing bias exists among mental health clinicians. This analogue study suggests the potential for clinicians to under-recognize and under-treat non-traumatic stress-related psychiatric symptoms when a youth endorses PTE exposure. Future work to elucidate moderators of this bias and to design interventions to mitigate it are indicated.

Acknowledgements:

The authors gratefully acknowledge Ms. Anisa Hasan-Granier.

Funding:

This research was supported by pilot funds awarded to Emily M. Becker-Haimes from the National Institute of Mental Health to the Penn ALACRITY Center (NIMH P50113840; MPI: Beidas, Buitenheim, Mandell).

Data Availability:

The data that support the findings of this study are available from the corresponding author, EBH, upon reasonable request.

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Key Points and Relevance

- Clinicians may exhibit diagnostic bias when youth report a trauma history, leading to inappropriate treatment practices
- We adapted an established, vignette-based experimental paradigm to test if youth trauma overshadows other co-occurring psychiatric conditions
- Clinicians rated target diagnoses less likely and target treatments less appropriate for youth with a trauma history than youth with identical symptoms without a trauma history
- Clinicians may under-recognize and under-treat non-traumatic stress-related mental health symptoms in youth with a co-occurring trauma history.
- More research to better understand this bias and design interventions to mitigate it are warranted

Table 1.

Results of ANOVA Examining the Presence of a TDOB.

	No PTE <i>M, SD</i>	Physical PTE <i>M, SD</i>	Sexual PTE <i>M, SD</i>	<i>F (df)</i>	<i>p</i> value: omnibus <i>F</i> test	partial η^2	<i>p</i> value: Sexual vs. No PTE α	<i>p</i> value: Physical vs. No PTE α	<i>p</i> value: Sexual vs. Physical PTE α
<u>Vignette 1: OCD Adolescent Female</u>									
	<i>n</i> = 134	<i>n</i> = 63	<i>n</i> = 69						
<i>Diagnosis</i>									
OCD (<i>Target</i>)	6.00 (1.19)	5.73 (1.33)	4.90 (1.80)	$F_{(2, 258)} = 3.87$	<.001	.10	<.001	.414	.003
Adjustment Disorder	2.59 (1.61)	2.37 (1.52)	3.09 (1.87)	$F_{(2, 239)} = 3.25$.041	.03	--	--	--
PTSD	2.97 (1.65)	4.85 (1.81)	5.49 (1.47)	$F_{(2, 245)} = 58.69$	<.001	.32	<.001	<.001	.071
<i>Treatment</i>									
ERP (<i>Target</i>)	5.52 (1.67)	5.24 (1.54)	4.21 (2.24)	$F_{(2, 237)} = 10.86$	<.001	.08	<.001	.600	.006
TF-CBT	3.09 (1.98)	5.03 (1.86)	5.78 (1.30)	$F_{(2, 247)} = 55.69$	<.001	.31	<.001	<.001	.046
<u>Vignette 2: ODD Pre-Adolescent Male</u>									
	<i>n</i> = 132	<i>n</i> = 70	<i>n</i> = 64						
<i>Diagnosis</i>									
ODD (<i>Target</i>)	5.54 (1.34)	4.71 (1.80)	3.85 (2.05)	$F_{(2, 245)} = 21.98$	<.001	.15	<.001	.004	.012
Adjustment Disorder	3.28 (1.87)	3.84 (1.64)	3.26 (1.98)	$F_{(2, 237)} = 1.99$.14	.02	--	--	--
PTSD	1.76 (1.28)	5.58 (1.36)	5.83 (1.33)	$F_{(2, 243)} = 280.72$	<.001	.70	<.001	<.001	.562
<i>Treatment</i>									
PMT (<i>Target</i>)	5.83 (1.43)	5.34 (1.50)	5.20 (1.43)	$F_{(2, 230)} = 4.43$.013	.04	--	--	--
TF-CBT	2.21 (1.63)	5.89 (1.21)	6.02 (1.22)	$F_{(2, 246)} = 211.31$	<.001	.63	<.001	<.001	.874

* *p* < .05.

** *p* < .01.

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 $p < .001$

^aStatistic only reported in the presence of a significant omnibus F test. PTE = Potentially Traumatic Event. OCD = Obsessive-Compulsive Disorder. PTSD = Post-Traumatic Stress Disorder. ODD = Oppositional Defiant Disorder. TF-CBT = Trauma-Focused Cognitive-Behavioral Therapy. ERP = Exposure and Response Prevention. PMT = Parent Management Training.

Table 2.

Results for Forced Choice Questions about Diagnosis and Treatment

	Vignette 1: OCD Adolescent Female		Vignette 2: ODD Adolescent Male			
	No PTE n (%)	Physical PTE n (%)	Sexual PTE n (%)	No PTE n (%)	Any PTE n (%)	Sexual PTE n (%)
	n = 134	n = 63	n = 69	n = 132	n = 70	n = 64
<i>Primary Diagnosis</i>						
ADHD	0 (0)	0 (0)	0 (0)	16 (12.5)	1 (1.5)	0(0)
OCD	122 (91.7)	35 (56.5)	31 (44.9)	1 (0.8)	0 (0)	2 (3.2)
Adjustment Disorder	5 (3.8)	2 (3.2)	2 (3.2)	11 (8.6)	5 (7.6)	7 (11.1)
PTSD	5 (3.8)	23 (37.1)	31 (44.9)	2 (1.6)	37 (56.1)	39 (61.9)
MDD	0 (0)	1(1.6)	0 (0)	7 (5.5)	3 (4.5)	4 (6.3)
ODD	0 (0)	0 (0)	0 (0)	87 (68.0)	19 (28.8)	11 (17.5)
No Diagnosis	1 (0.8)	1 (1.6)	0 (0)	4 (3.1)	1 (1.5)	0(0)
<i>Treatment Selection</i>						
TF-CBT	16 (12.0)	33 (53.2)	50 (72.5)	6 (4.6)	42 (64.6)	41 (65.1)
ERP	87 (65.4)	24 (38.7)	13 (18.8)	7 (5.4)	1 (1.5)	1 (1.6)
Habit Reversal Training	12 (9.0)	3 (4.8)	3 (4.8)	9 (6.9)	3 (4.6)	2 (3.2)
PMT	3 (2.3)	0 (0)	0 (0)	70 (53.8)	11 (16.9)	9 (14.3)
Play Therapy	2 (1.5)	1 (1.6)	1 (1.6)	29 (22.3)	8 (12.3)	4 (6.3)
Other Therapy Not Listed	13 (9.8)	1 (1.6)	1 (1.6)	9 (6.9)	0 (0.0)	6 (9.5)

PTE = Potentially Traumatic Event. ADHD = Attention-Deficit/Hyperactivity Disorder. OCD = Obsessive-Compulsive Disorder. PTSD = Post-Traumatic Stress Disorder. MDD = Major Depressive Disorder. ODD = Oppositional Defiant Disorder. TF-CBT = Trauma-Focused Cognitive-Behavioral Therapy. ERP = Exposure and Response Prevention. PMT = Parent Management Training.