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Commentary: The Need for Theories of Change in Training and Technical Assistance: Where the Rubber Meets the Road

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Abstract

In this commentary, I revisit some of the core issues raised in both the first and second special issues on "Strengthening the Science and Practice of Implementation Support: Evaluating the Effectiveness of Training and Technical Assistance Centers." I first outline the concerns that I think are of paramount importance and then very briefly dissect each one from the perspective of a prevention scientist. I add commentary where I think the field can benefit and strengthen to advance the "science" of implementation support. At the same time, I also raise several points that I think will contribute to a better understanding of "how" TTA works, for "whom" and under what conditions. This portion of the commentary attends to the different training and learning modalities used for TTA, the argument that capacity building should be the objective, decluttering the constructs of motivation and readiness, and whether we can ever validly assess a public health impact from TTA. I offer suggestions to address each concern and hope that the field can benefit from this discussion as we usher in a new era.

Keywords

knowledge, mechanisms, skills, theories of change, training and technical assistance

Introduction

This is the second issue of a "special issue" published in *Evaluation & the Health Professions* that addresses the evaluation of training and technical assistance centers. Abe Wandersman, a luminary in the field, shared the Guest Editor role with me as we assembled both issues. One day, Abe called me very early in the morning (we live in different time zones) and suggested that we add "commentaries" to the second issue, which we both agreed was fitting and would benefit the readership. We invited several well-respected scholars in the field, mostly colleagues that Abe knew personally and who had been involved in TTA for quite some time. Then Abe asked me to also write a commentary, given my role as Editor and also because he felt that I was slowly becoming an implementation scientist (leaving my roots as a prevention scientist?). Abe indicated to me that there were some unresolved issues that created an undercurrent from both issues and I was an ideal person to address them. As part of this conversation, Abe suggested that I address my favorite pet peeve, which has to do with theories of change (TOC). I completely understood why Abe asked me to offer some critical commentary on this topic. This is because during the peer review process I had been remarking to many of the contributing authors (for both issues) that there was a clear neglect of theory and very little attention paid to "mechanisms" (i.e., causal agents of change) in the TTA literature.

It does not take much to see why this discussion was so redolent of my own background and training[1]. In the first issue, Abe and I had commented in the Introduction, "Training and technical assistance, like any intervention, requires a theory of change that specifies how TTA strategies affect knowledge, skills, efficacy, and motivation, which, in turn, improve delivery of evidence-based interventions" (Wandersman & Scheier, 2024, p. 145). Abe was just picking up on my mantra and asking me to be more specific about the ways that TTA could benefit from the application of TOC and what specific theories would be relevant.

Why Theories of Change?

Theory is a starting point where scientists explicate what they believe are the underlying mechanisms that contribute to some event, behavior, or outcome. Theory wields a powerful sword

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in terms of validating reality, because a good theory can cut through the wheat and chaff and get down to the bottom of things. Bad theories, according to Popper's falsification hypothesis (Popper, 1959), need to be discarded in our efforts to approximate the truth, if such a thing exists. This, according to Popper was the "demarcation point" where science can be distinguished from non-science. It is also, by any stretch of the imagination, the point where implementation science obtains the stature of a true science. This is because theory is the backbone of scientific enterprise, where we dispel notions of uncertainty and shore up our arguments about causation and effects[2]. Theories have consequences, and become "lawful" in the sense that they account for human experience by rules and regularity. They are testable, refutable, and in the strictist sense objective[3]. In the current context, elaboration of a specific theory enables the field to specify what training and technical assistance (TTA) is, how it works, what it leads to, and why.

Certainly, I am not the first or only scholar to address the need for theory and explicating mechanisms that underlie TTA (e.g, Aldridge et al., 2023; Bell et al., 2017). In the field of implementation science, this has been a clarion call made by numerous authors (Albers, Metz, & Burke, 2020; Bertram et al., 2015; Leeman et al., 2017; Lewis et al., 2018, 2020; Metz et al., 2021), to name a few. All of these authors have highlighted in some fashion what Abe and I had noted in the first introduction as the "black box conundrum" (e.g., Astbury & Leeuw, 2010; Harachi et al., 1999; Hoagwood et al., 2013). Here, I reinforce the importance of our original statement, by quoting Fletcher (2014, p. 128), "there is a 'black box' at the heart of primary prevention; that is, there is something unknown about the internal workings or processes that are necessary for change. In other words, the black box in primary prevention is the space between the actual inputs and expected outputs of programs – the space that should be filled with an articulation of just how change will be generated, through processes of interaction." While this is an important clarification, heralding the problem is not enough, and we need to move the needle so that we can unpack the mechanisms that underlie the desired type of change emphasized by TTA (e.g., Aldridge et al., 2023; Lewis et al., 2018; Nilsen, 2015).

An organization may have a specific need for "capacity building" (e.g., Heward et al., 2007; Lehman et al., 2002). Form this perspective, a theory of change (TOC) might focus on resources, personnel, time allocation, logistical support (financial and otherwise), and other "facilitators and barriers" that influence whether practitioners will adopt and sustain interventions. These are quite varied and can include organizational approval of the innovation, buy-in by leadership, the role of champions (i.e., key stakeholders), a supportive climate and culture building to make operational if not institutional changes, all of which may be harbingers of ultimate shifts in the power structure (e.g., Nielsen & Randall, 2013). Individual practitioners may require capacity building but they may have specific needs tied to an intervention (i.e., innovation-specific capacity building) that revolve around imparting knowledge and skills. Here too, we can ask more specific questions, like "knowledge of what" and "skills in what area?" Addressing these concerns would provide a foundation to what Scott et al. (2024) call a TA Effectiveness Logic Model. If we are looking to be more rigorous and follow the lead of scientific reasoning (i.e., making causal attributions), we can specify what knowledge and clarify which skills[4]. Then, in an appropriate experimental setting, we can address whether a specific intervention (e.g., learning collaborative vs. coaching) results in measurable changes in the designated outcomes. In terms of theories of change, this is what Hawe et al. (2009) suggested requires "pinning down causal pathways" (p. 268).

Downstream Effects of TTA

A second issue arises that if we adopt this posture, what can we expect that change in knowledge or skills will produce at the level of service delivery? In other words, TTA is not only about improving the capacity of practitioners (or organizations) vis a vis "practice or implementation outcomes," but rather also involves a public health (or population) outcome (e.g., Bertram et al., 2015; Proctor et al., 2011). For example, if TTA is provided to bolster skills in mental health practitioners who operate in schools, will we see a drop in rates of mental health problems among the student population (e.g., reduced depression or less absenteeism)[5]. The causal linkage goes as follows: If practitioners learn new skills and increase their knowledge regarding evidence-based programs (EBPs), they should be more effective in their work, have access to more resources (e.g., information and social networks), and feel more proficient or confident as they employ their new skills. This should in turn lead to more effective detection (i.e., application of screening methods using psychometrically refined instruments), treatment, and outreach to students and their families. This, in turn, leads to changes in behavioral outcomes for students.

As another example, if TTA is applied in community settings tied to funding from CDC's Division of Violence Prevention, will there be reductions in community levels of domestic or interpersonal violence? Trained practitioners should have better outreach to community coalitions, more visibility where needed, greater emphasis on using EBPs, and garner better rapport in their communities (i.e., building trust). This is perhaps the impetus behind the work of (Stanley et al., 2024) and reflects the focus of the Violence Prevention Technical Assistance Center. Pushing this argument further, how will we assess the anticipated changes that result from TTA? For one thing, TTA may be delivered to small groups of individuals or even larger organizations. This is the gist of what Bohnenkamp et al. (2024) attempted by offering learning collaboratives at multiple levels including to small groups of practitioners in addition to statewide coalitions. The problem is that the work that practitioners engage is often delivered on a community-wide basis or to larger organizations (i.e.,

schools, communinty-based organizations, coalitions); this would require linking TTA provided to specific groups or body of practitioners, in a specific context, and with a specific modality of training, tied to a specific endpoint that is often assessed at a much higher level of aggregation (e.g., prevalence of domestic violence in a defined period). From a methodological standpoint, this requires linking data that may be hierarchically nested, which carries with it concerns over modeling different sources of variation corresponding to the different levels of aggregation[6].

There is also a paucity of rigorous experimental designs used to assess the effects of TTA. If TTA is considered an "event" fashioned as an intervention that occurs at some noticeable point in time, we can track its effects on practitioner behavior and public health outcomes using a quasi-experimental interrupted time series design (ITS; Bernal et al., 2017; Sanson-Fisher et al., 2014). The design characteristics include establishing what happened cumulatively up to the introduction of the event (i.e., intervention) and what happened after the event, documenting the change between pre- and post-intervention time periods (i.e., estimating level or slope differences). This design avoids threats to internal validity that come from short-term variation in behavior, undocumented temporal effects, and regression to the mean. The ITS design is based on the concept of the "counterfactual," which simply states, "if we do nothing, what is the state of practitioners in terms of knowledge, skills, attitudes, efficiency, and capacity and how did this change after the intervention?"

A randomized controlled trial is more powerful experimentally, but their use is rare as a means to assess the effect of TTA (for implementation exceptions see, Beidas et al., 2012; Brown et al., 2021; Chinman et al., 2018; Eiraldi et al., 2014). In truth, it is not the lack of experimental paradigms that fosters the many questions. Many ways exist to assess the causal flow linking TTA with practitioner behavior change at the point of service delivery. This issue is not new to the field of implementation science by any stretch of the imagination (e.g., Damschroder, 2020; Lewis et al., 2020). Setting aside that RCTs are still regarded as the 'gold standard' for evaluating the evidence base (e.g., Backmann, 2017; Rubin, 2008), there is still ongoing discussion regarding what makes TTA (and implementation science more generally) evidence-based (e.g., Brownson et al., 2022; Fixsen et al., 2009 and see Regehr et al., 2007 for extension to social work practice). Here, we should not let the dogma of methodological imperatives lead us away from the main point, which is that we need greater clarity on what makes TTA "work" and impetus to explore the reasons why (i.e., studying methods of implementation, see for example, Fixsen et al., 2009).

TTA is a Complex Intervention

A third issue addresses the myriad of ways we can "intervene" in offering TTA. In other words, there is a multiplicity of ways to provide TTA, including coaching, facilitation, webinars, learning collaboratives, intensive trainings with subject matter experts, ongoing consultation, provision of informational resources, site visits, and other learning approaches (Katz & Wandersman, 2016). In many instances, TTA can be "bundled" and offered as a package by the support system. This requires another level of analysis, using a dismantling design or componential analysis strategy to ferret out which aspect of the TTA is giving the biggest bang for the buck (West et al., 1993). There are several recent examples of how these strategies can be used to examine the effects of various training initiatives on patient outcomes (e.g., Stirman et al., 2013; van den Heuvel et al., 2019). To be quite honest, prevention scientists are often reluctant to engage in teasing apart the effects of a multicomponent intervention. This is usually because their "sell" is that the full program is what makes the intervention beneficial, not one component at the expense of another. Part and parcel of this argument (if you are a prevention scientist) is that some beneficial program components may be "dormant" and surface later after skills are mastered (i.e., tested and refined based on need). A second argument is that program components work "synergistically" and this may very well be true. For instance, school-based drug prevention programs often work under the premise that teaching social and communication skills strengthens the ability of youth to refuse drug offers. This is because students gain self-efficacy and become more assertive (in an age appropriate manner), which has spillover effects (Scheier, 2015). Tied to both arguments is the notion that removing any one component (for the reasons stated above) may render the entire intervention "inert." A real-world example of this problem is the Hasbro game Jenga that uses wooden blocks to build an edifice. However, it is noteworthy that removal of one block can make the entire structure crumble. Regardless of content or focus, it may very well be that implementation scientists adopt the same argument. That is, it is not one particular modality of TTA that nets the biggest bang for the buck, rather there is a multiplicity of training methods that converge on the desired outcome (e.g., more efficient if not smarter practitioners). Although there is no cure-all for this problem, there are statistical remedies to consider when addressing the relative efficacy of a multicomponent program including the fractional factorial design (e.g., Chakraborty et al., 2009). In a complex intervention, this approach makes it possible for TTA providers (support system) to address precisely which modality of training or TA contains active ingredients that are the most efficacious (and possibly which combination of strategies work best).

TTA is all About Mastery and Self-Efficacy

A larger and perhaps more pressing issue is the question of "motivation' or what Domlyn et al. (2021, see also Scaccia et al., 2015) have indicated as part of their "readiness" equation using the $R = MC^2$ framework. Motivation is central

to why practitioners will adopt a new program (i.e., program, practice, and policy are all considered an "innovation") as part of their standard operating procedures, implement it with fidelity, look for ways to sustain it operationally, and encourage buy-in at different organizational levels. The problem we encounter is that the construct of motivation is not linked to any substantive theory of human behavior, individual or organizational. For example, if by using the term "motivation" the authors really mean "impetus or desire to engage," we could tie this conceptualization to theories incorporating competence (White, 1959) or self-efficacy (Bandura, 1977). In the case of the former concept, it entails "enactment" and a capacity to "interact with the environment" (p. 297). In the case of the latter example, motivation is construed as an "expectance" or "belief" that reflects the product of mastery (i.e., proficiency derived from effective performance). Bandura (1997) was very specific in his theory, that self-efficacy reflected the belief that one can successfully execute a behavior (i.e., task) and achieve the desired outcome. A person who wants to lose weight will be determined to stick with a diet regimen and achieve the desired goal of weight loss (receiving compliments that they look terrific is a separate response-outcome expectancy). A person's self-efficacy determines whether they will cope when faced with obstacles, how much effort they will expend, and how long they will expend energy in the face of adversity. People also set up self-inducements, i.e., they create standards and evaluate their effort and accomplishments against these standards. Where discrepancies exist, this serves to motivate a person to engage more effort. Practitioners that don't feel like their work is satisfying or helping their clients, may not feel motivated to try harder, learn new skills, and engage their community using alternative approaches.

If we use self-efficacy theory as a framework to discuss TTA, then we can ask the question, "what is the desired outcome of TTA?" If you are Bandura, you first want to develop mastery and proficiency in the skills required to execute a task. This will improve levels of self-efficacy, which determines how resolute a person will be to acquire new skills, how hard they will work to use them in their practice, and how long they will try to implement them even when faced with difficult conditions. Thinking first about the practitioner, they want to become better at what they do at their job, which is service delivery (here "mastery or proficiency" cuts both ways). This can include becoming more proficient at choosing evidence-based programs that fit their client's needs, implementing programs with fidelity and avoiding program drift, engaging ongoing quality assurance/quality improvement by fastidiously evaluating their efforts, developing stronger and more secure (i.e., trustworthy) community collaborations, and sustaining their efforts over the long haul[7]. From their acquisition of skills, and based on personal reviews of their proficiency, practitioners will want to see some degree of "organizational change." However, this is an "outcome expectancy" because it concerns the practitioner's anticipation or belief that the organization will value their newly acquired skills, offer proper incentives, and institute some type of policy change that will ensure there is continued emphasis on practitioner proficiency (e.g.,leadership buy-in to support continued TTA and workforce development).

From the perspective of the trainer, the desired outcome(s) or instructional objectives may be that the practitioners have more knowledge about risk and protective factors. Furthermore, they should be more familiar with a program's active ingredients (i.e., understanding risk mechanisms and theories of change). They should have a larger skillset or toolkit for implementation, increased proficiency selecting and/or delivering programs, and possess increased resilience so they can withstand real-world setbacks with greater determination. These may be a handful of the core competencies required for TTA (Dunst et al., 2019; Metz et al., 2021).

These objectives do not discount the need to achieve organizational change as well (e.g., Bertram et al., 2015; Birken et al., 2022). Thus, instructional objectives apply to leadership as well, who can benefit from seeing that TTA nets better program outcomes, which is often how funders evaluate large organizations (i.e., their service providers are more efficient in delivering programs and this nets changes in valued public health markers). Taken as a whole, efforts to improve the status of the practitioner and the feedback process that informs the trainer that the practitioner is receptive to the training serve as a basis for "motivation." This now enables us to fill in the missing link in the Interactive Systems Framework (Wandersman et al., 2008) where the authors indicate a central if not pivotal role for 'motivation' in both the delivery and support systems. Here, I offer further conceptual clarity to the composition of motivation.

It is all About Relationships

At the very heart of all TTA is a relationship between the trainer (member of the support system) and practitioner (member of the delivery system) (e.g., Metz et al., 2022). The nature of the trainer-practitioner relationship is certainly critical to the success of TTA (e.g., Wandersman et al., 2012). There are many components to this relationship, all of which revolve around trust-building. Metz et al. (2022) suggest two key strategies that provide a basis for trust building: relational (focusing on the quality of the relationships, mutuality, and reciprocity) and technical (focusing on the content of the relationship including knowledge, reliability, and competency). Equally important is the selection of instructional learning methods and the choice of learning outcomes. Thus, as a first step in understanding this process, we need to come to terms with instructional modalities, as TTA can take many shapes and forms. Not all TTA is the same, and some of the articles in the two special issues showcase the many different forms of TTA, and the many different evaluation strategies used with TTA, some quantitative, others more qualitative. This leads to a problem regarding "which instructional

modality" nets superior outcomes, a point that has not been examined closely in the field and likewise has not been the focus of articles that make up this special issue.

Toward this end, I would like to see greater cross-fertilization between educational psychology, instructional design, and psychological theories of motivation. In other words, we need to be able to explain how people learn using the different TTA modalities, specifically what they learn, what techniques are most profitable in terms of learning, and what practitioners are capable of applying in a real-world context. This is what educational theories seek to explain when they blend instructional design with learning theories (e.g., Kraiger et al., 1993; Tennyson, 2010). From an educational perspective, this can be as simple as incorporating Bloom's (Bloom & Krathwohl, 1956) taxonomy with an eye cast toward assessment, learning, and teaching. The fundamental levels of his hierarchical taxonomy include knowledge, comprehension, application, analysis, synthesis, and evaluation. Newer verb-oriented versions include remembering, understanding, applying, analyzing, evaluating, and creating. Regardless of which approach one follows, the bottom line suggests that we dissect the cognitive process of learning and apply this in TTA so that we have clear learning objectives.

I would also like to see greater reliance on prominent theories of learning that value active learning strategies and base their work on a constructivist perspective (Vygotsky, 1978). This would entail emphasizing situated cognition (e.g., Brown et al., 1989; Kirshner & Whitson, 1997), scaffolding and other related pedagogical techniques that emphasize active learning and cognitive apprenticeships (e.g., Collins et al., 1989). Here too, those familiar with Bandura will note his emphasis on graduated tasks as a form of treatment based on self-efficacy theory. Generally speaking, this approach asks people to engage difficult tasks in small progressive steps, progressively entreating them to try, then try harder until they are successful. Adopting this type of "learner-centered focus" is what I think the field warrants going forward, as it will push the event horizon and encourage those engaged in TTA to evaluate with greater alacrity what they do. Therefore, a central goal going forward should be to articulate theories of TTA with greater rigor, test them in real-world conditions, refine them, and discard those that don't hold up to challenge. In defense of good theory, Popper wrote, "So long as theory withstands detailed and severe tests and is not superseded by another theory in the course of scientific progress, we may say that it has 'proved its mettle' or that it is 'corroborated'" (1959, p 10). This point of demarcation, to use Popper's term, is where the rubber meets the road.

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Notes

1. A good deal of my own body of work has focused on delineating mediating "mechanisms" in the field of adolescent drug prevention (see for example, Scheier, 2015; Scheier et al., 2001).
2. See Pearl (2000) for an excellent review of causation in the scientific realm and Mackie (1965; 1980) provides explicit conditions for causation (insufficient but necessary and unecessary but sufficient) that goes to the heart of causal induction in scientific reasoning.
3. Birken et al. (2018) suggest other categories should be associated with selecting theories, models, and frameworks including their usability, applicability, and familiarity in addition to testability. Popper takes a more philosophical approach to reifying theory leading to his reliance on falsifiability (it can be tested and "refuted").
4. Aldridge et al. (2023) outline *core competencies* and *essential practice functions* as part of their effort to address mechanisms involved in TTA. They also propose conditions necessary for activation of their model, and posit effects of core practice competences on both proximal and distal practice outcomes. An important component to their model is the role of self-regulation in effective implementation, which captures the "agency" or will of an organization to regulate its own growth and development (i.e., problem solve without external support).
5. A very good example of where this type of thinking plays out can be found in Schoenwald et al. (2004) who examined effects of expert consultation on therapist fidelity and child outcomes.
6. As Murray (1998) and others (Scheier et al., 2002) have noted, failure to acknowledge the nesting of data can bias standard errors of the treatment effect and lead to inflated Type I error rates in group-randomized trials (increasing the probability that a researcher will reject a true null hypothesis of no effect). This happens because of the failure to parse variation between the different levels of experimental assignment (i.e., clinics or communities) and the unit of analysis (e.g., individuals within a clinic or community).
7. Bandura is used here only as an example, reflecting a cognitivist perspective. Other perspectives, including behaviorism and constructivism could also be used to elaborate a model of learning and instruction.

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