Adding Adaptation/Modification Size and Scope to Frameworks for Classifying Changes to an Intervention

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**Abstract**

Frameworks for classifying adaptations and modifications to an intervention have been developed and continue to evolve. These frameworks capture a range of attributes of adaptations and modifications. However, the size and the scope of a change, relative to the intervention’s overall size and structure, are not currently included. This omission can have negative consequences, especially for conclusions about how different kinds of changes to an intervention may influence implementation quality and intervention outcomes. Coding the relative size and scope of an adaptation or modification should be simple when the original intervention is described in detail. For interventions that are not manualized, coding may alternatively be based on rater judgments. Attending to the size and the scope of adaptations and modifications could have an ancillary benefit, generating increased conceptual and empirical work on procedures for identifying the distinct components and sub-elements of an intervention.

**Keywords:** adaptation, modification, implementation, intervention components

**Introduction**

Adaptations and modifications are commonplace when evidence-based prevention interventions, and programs in general, are implemented (Miller-Day et al. 2013; Hansen et al. 2013; Stirman et al. 2019). Adaptations are systematic, planned changes, especially to adjust an intervention for new settings, while modifications include unplanned changes resulting from unexpected circumstances (Movsisyan et al. 2019). Alternative frameworks have been developed for classifying the attributes of adaptations and modifications (Hill et al. 2007; Moore et al. 2013; Stirman et al. 2013). Work in this area continues, including the systematic comparison of alternative frameworks (Kirk et al. 2020; Movsisyan et al. 2019) and the continued development of individual frameworks (Stirman et al. 2019; Kirk et al. 2020).

Frameworks for the classification of adaptations and modifications to an intervention are potentially valuable in several ways. They can be helpful in efforts to: describe the kinds of changes made to an intervention in various contexts; conduct research on the effects of various kinds of adaptations and modifications on an intervention’s implementation, outcomes, and sustainment; understand better the kind of adaptations that enhance rather than inhibit intervention effectiveness; and engage in more thoughtful planning of adaptations (Kirk 2020).

Arguably the most extensive framework to date comes from Stirman and colleagues (2013; 2019; Kirk et al. 2020). Expanding on the initial 2013 coding system, Stirman et al. (2019) presented the Framework for Reporting Adaptations and Modifications – Enhanced (FRAME), and Kirk et al (2020) subsequently offered a few revisions. The updated FRAME includes attention to (a) when in the implementation process the change was made, (b) who made the change, (c) at what level of the intervention (e.g., overall or at the individual service provider level), (d) what was changed (content, context, or training and evaluations), the nature of the change in the case of (e) context and (f) content modifications, (g) whether the change was systematic and proactive, systematic and reactive, unsystematic and proactive, or unsystematic and reactive, (h) a judgement regarding the extent to which the change was consistent or inconsistent with core functions (i.e., consistency with implementation fidelity), and (i) the reason(s) for the change (with options such as cultural responsiveness, increased feasibility, reduced cost, and improved sustainability).

Kirk and colleagues (2020) expanded on FRAME by developing a complementary model that can guide future research on the consequences of adaptations and modifications. In Kirk et al.’s (2020) Model for Adaptation Design and Impact (MADI), most of the characteristics included in FRAME are treated as adaptation features that may influence implementation and intervention outcomes. The model identifies one mediator, alignment with core function (i.e., relationship to fidelity), and a few potential moderators (e.g., whether the adaptation was made to increase fit, or was undertaken to overcome a potential obstacle). MADI also includes a list of implementation and intervention outcomes. These are to be treated as potential outcome variables in research on the apparent consequences of adaptations.

The evolving Stirman framework includes impressive detail regarding a program adaptation or modification. At the same time, no framework is perfect, as is implied by the continued modifications made by the framework developers. The current commentary suggests an additional expansion of this and other frameworks: *inclusion of the size and the scope of the modification or adaptation, in relation to the overall intervention*. Consider an unplanned modification to the content of Bright Start, a school-based obesity prevention intervention. The change involved the removal of a program element, specifically, the mid-intervention dropping of the motivational phone call element of the family environment component (Story et al. 2011). After limited success in reaching parents by phone, the third of three planned calls was eliminated. These phone calls were one element in Bright Start’s family environment component, which was one of three overall program components. Regarding size, the dropping of one phone call is a smaller modification than would be the dropping of two or of all three calls. This in turn is a smaller modification than if, instead of motivational phone calls only, the entire family environment component of Bright Start had been dropped -- even though the two modifications might be identical in terms of the other attributes coded in FRAME and related frameworks. Shifting to scope, this construct is open to alternative conceptualizations. However, arguably the most codable conceptualization, as well as the one most easily distinguished from size, treats scope as the proportion of an intervention’s major subdivisions (e.g., sessions or components) that are affected by the adaptation or modification in question.

Inclusion of relative size and scope is important for optimal use of a framework that classifies adaptations and modifications to an intervention. This is particularly the case when the Stirman framework (or an alternative) is used in research on the consequences of program modifications and adaptations. In presenting MADI, Kirk et al. (2020) persuasively call for such research, with adaptations coded using the latest version of FRAME, and with the coded adaptation characteristics serving as independent variables predicting relevant implementation and/or intervention outcomes. Multiple features of adaptations and modification would be coded, but at present the size and the scope of a program change would not be included. Relatively common forms of content changes, such as adding elements, shortening/condensing, lengthening/extending, and substituting (Stirman et al. 2013) can all vary in size and potentially vary in scope. (Even changes that fall under the current FRAME code of tailoring/tweaking/refining might vary in size). Without coding of the size and the scope of program changes, MADI-style investigations may lead to flawed interpretations if size and/or scope are confounded with other predictor variables. For example, if program developers make larger changes than do program implementers, and if the changes made by these two categories of decision makers are associated with differential outcomes, interpretations could erroneously focus on explanations such as the decision maker’s distance from the action or their familiarity with relevant theory -- unless the size and scope of the change is also coded.

 In many program areas, the size and the scope of a content change can be coded in relation to planned structure and content of the intervention. This should be relatively easy when the planned intervention is described in detail, such as in manualized interventions that specify the number of sessions and provide a detailed curriculum or intervention plan for each session. In such instances, the relative size and scope can be described, respectively, in terms of the estimated percentage of overall content and the percentage of sessions affected. For instance, Figure 1 represents a school-based intervention with each bar representing one of 10 60-minute sessions. If an implementer substituted new material for 15 minutes of a single lesson, the change can be described as involving 2.5% of the total content (15 minutes out of 600), with scope of 10% (i.e., 1 session out of 10). This is represented by the cross-hatched shading in Session 1. In contrast, a broader revision of a curriculum that changed an average of 15 minutes per session and involved all sessions, as in the collective shaded portions in Figure 1, the size of the change would be 25% and the scope 100%. Importantly, these estimates of size and of scope would be the same regardless of who made the change, or the reason for the change, or any of the other attributes included in FRAME and similar frameworks.

Some interventions are not detailed by session, but instead are described in terms of sub-units such as program components. Components are sometimes represented with distinct boxes on the lefthand side of a diagram of the intervention’s theory of change, often with more specific activities described within each component (Donaldson 2007). Although attention to program components is relatively long-standing (e.g., Bickman 1985), generally accepted, explicit standards and practices do not exist regarding what defines a component. In practice such distinctions appear to be based on commonalities within components and differences across components, based on one or more of the following: program goals (Bickman 1895), client needs or sources of the problem (Sidani & Sechrest 1999), intervention modalities (McCoy et al. 2016), theoretical constructs or pathways to change (Bartholomew et al. 2016), levels of analysis (DeJong & Langford 2002) and, commonly, interrelated intervention activities. In some cases, the componential structure of an intervention is defined by intervention developers, perhaps most often based on the theoretical and empirical base underlying the intervention (Bartholomew et al. 2016). In other cases, an intervention’s components are identified in the more general process of developing or uncovering a program theory (Donaldson, 2007). In these instances, the decision criterion for defining components essentially involves shared judgment of those involved in laying out the intervention’s theory of change, presumably based on such factors as commonality of intervention activities and goals. Components can also be identified empirically, as by the concept mapping used by Anderson et al. (2006), though this appears to be infrequent in practice.

Regardless of how components have been defined, coding the size and the scope of program adaptations and modifications can take advantage of the intervention structure as presented. This is especially the case when more specific activities or elements have been detailed within each intervention component. Returning to the previously mentioned Bright Start obesity program for kindergarten and first grade students, the intervention was described in terms of three components and their elements: *physical activity at school*, which included in-class action breaks, twice-weekly class walks, physical education, and active recess; *healthy eating at school*, with training and monitoring of food-service staff and teachers on matters related to healthy in-school meals, drinks, snacks and incentives; and *family environment*, implemented primarily through three Family Night events with a meal and dissemination of behavioral messages via interactive booths and physical activities, as well as goal setting and the distribution of relevant take-home gifts (e.g., a jump rope and fresh fruits\vegetables). Intervention group parents also received a quarterly newsletter including relevant tips.

The family environment component originally included motivational phone calls by trained staff who helped with goal setting, encouraged the parents’ efforts, and assisted parents in evaluating their progress. The dropping of the final call, while noteworthy as a program modification, is modest in its relative size. It involved only one of three planned calls, with the calls representing a minority of activities in the family environment component, which was the component with the fewest activities. Moreover, the modification was also limited in scope, involving only one of three components. If this change to the Bright Start program were included in the dataset for a study of the kind suggested by Kirk et al. (2020), and if another, similar program in the dataset had dropped the entire family environment component, then size of the modification would be confounded with whatever other characteristics the two cases differed on.

Although future work is needed regarding the reliability of codings of size and scope, raters should be able to differentiate, for example, between the dropping of one motivational phone call and the elimination of the entire family environment component. Regarding scope, raters should also be able to differentiate between an adaptation or modification that affected only one session or component and another change that involved all of them. As an example of the latter, the Bright Start program was developed for Lakota children on the Pine Ridge reservation in South Dakota. If the program were adapted for cultural fit elsewhere, potentially the change would occur across the entire scope of the intervention.

Another approach to coding the size and the scope of an adaptation or modification would be to rate these two features on a scale during the coding process. This simple approach would join other judgment-based variables currently in adaptation/modification classification systems, such as the coding of whether a change is consistent, inconsistent, or neutral with respect to fidelity/core functions (Kirk et al 2020; Wiltsey Stirman et al. 2019). Under this approach, ratings of size and of scope could be made on a 9-point or other scale. In a variant on this approach, ratings of the size and the scope of a change to an intervention could be made by intervention designers or implementers. However, the feasibility of obtaining program designers’ or implementers’ ratings across the multiple interventions within a study’s dataset might make this variant less useful for research on the effects of program adaptations and modifications.

Rater coding of size and of scope on a scale might be the preferred option when examining a program area in which detailed descriptions of programs are relatively infrequent, or in which the level of description varies widely across programs (e.g., with a third each manualized, described in terms of a few components, and lacking any delineation of program segments). In contrast, when the bulk of programs in an area of interest are similarly described, especially with detailed manuals specifying content by session, the coding of size and of scope relative to the overall program plan seems preferable.

**Discussion and Conclusions**

Given how commonplace program adaptations and modifications are, systems for classifying the characteristics of such changes have important uses, including in research on the consequences of such changes for implementation and intervention outcomes (Kirk et al. 2020). Although existing frameworks capture a wide range of the attributes of the adaptations and modifications made to an intervention, the relative size and scope of the change is not yet among them. Without considering the size and the scope of an adaptation or modification, the conclusions drawn from research on the consequences of such changes are likely to be misleading.

Coding the relative size and scope of an adaptation or modification should be relatively straightforward when the original intervention is described in detail, as is the case for manualized interventions. When the planned intervention is not as fully detailed, the size and the scope of an adaptation or modification can be coded based on an existing description of the structure of the intervention. The latter approach could have a positive side-effect, increasing attention to the procedures used to identify the distinct components of interventions. The development of common practices and criteria for defining intervention components (or for some other way of representing the internal structure of an intervention) could have broader benefits for intervention design, adaptation, and dissemination.

 The primary limitation of the current proposal is that it has not been systematically tested. Future tests should address two issues. First, reliability should be assessed for observers’ coding of the magnitude of an adaptation or modification, relative to the overall size and scope of the intervention. It seems likely that, for example, it will be relatively easy to differentiate the skipping of one activity in a 15-session intervention from the dropping of one of three intervention components. Actual coding of size and scope will be needed, however, to verify the reliability of such coding. For interventions without highly detailed plans, the coding of scope will also depend on whether those who described the interventions components were lumpers or splitters, that is, whether they elected to describe a few broad components or instead specified a larger number of narrower ones. To avoid this potential complication, for program areas in which detailed descriptions of programs are not commonplace and the breath of components appears to vary greatly across programs, simple coding of size and scope on a multiple-point scale may be preferable. In any case, the coding of scope and especially of size should not be substantially more difficult than is coding some of the variables in current frameworks, such as consistency with core elements. Second, future tests should examine the extent to which differential findings and additional explanatory value result if size and scope are coded in studies of the kind suggested by Kirk et al (2020) and their MADI framework. The current paper argues that coding size and scope will help prevent inaccurate inferences about the consequences of program changes. However, this assertion awaits empirical confirmation. Ideally, evidence will accumulate over time regarding the circumstances in which size and/or scope influence the observed effects of program adaptations and modifications.

Another limitation of the current paper is that it has focused on content changes. Contextual adaptations and modifications instead involve changes to: the delivery format or channel (e.g., a shift from individual to group delivery); setting; personnel, that is, the type of service providers; and population, that is, service recipients (Stirman et al. 2013). For these elements, there is not an analogy to the structure of a program, as in the set of sessions or components that comprise program content. Hence, scope does seem not to apply to contextual changes. On the other hand, especially with training, raters might be able to reliably judge the size of a contextual change. For example, a shift from PhD providers to certified Masters level providers is presumably smaller than a shift to untrained peer providers. However, actual experience with such coding would be required to confirm the reliability of ratings of the size of contextual changes. In addition, empirical testing would be needed to assess the value of such an addition to FRAME or other classification systems. For adaptations or modifications of training and evaluation, it seems likely that the size and the scope of the change are not as relevant. Further work on size and scope would profitably focus on content changes, at least initially.

In short, the case seems strong for including size and scope in frameworks for classifying the characteristics of content adaptations and modifications to an intervention. This may be especially important when these frameworks are used to examine the consequences of different kinds of changes to an intervention’s implementation and outcomes. If such efforts also contribute to increased attention to the procedures for defining the internal structure of an intervention (e.g., its components), this would be a desirable side-effect.

**Compliance with Ethical Standards**

**Competing interests** The author declares that he has no competing interests

**Ethics approval** This article does not contain any study performed by the author with human participants or animals

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