Author's response to reviews

Title: Social Networks and Implementation of Evidence-Based Practices in Public Youth-Serving Systems: A Mixed Methods Study

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Author's response to reviews: see over
School of Social Work

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RE: MS #1708727357516378 “Social Networks and Implementation of Evidence-Based Practices in Public Youth-Serving Systems: A Mixed Methods Study”

Dear Implementation Science Editorial Team:

Attached please find a revised version of the above referenced manuscript. In accordance with the comments and suggestions provided by the reviewers, we have made the following revisions:

Reviewer #1:

1) It would be useful if the authors provided in an annex or a separate document the codebook developed for the qualitative analysis.

The codebook is over 24 pages in length and quite detailed. It would add considerably to the overall length of the manuscript. If the journal provides a website for supplementary material and the editors feel that such a codebook would be of value, we would be happy to provide it.

2) I thought that the discussion towards the end of the paper on the potential use of networks in implementation is quite interesting and would merit some further development and qualification. A minor point in relation to that is that it seems to me that the evidence presented does not warrant a strong claim that “the units of implementation are social networks that cut across agencies and counties, not the agency or county itself.” (p.17 para 2) Indeed, the paper does not offer any robust conceptualisation of networks beyond the use of network as a broad metaphor for overlapping relationships and exchanges that are embedded into existing institutional structures. And in this sense networks are not an alternative but parallel structures or quasi-structures with complementary properties, but not necessarily full alternatives. More specifically, while drawing on the presented evidence it seems to be possible to argue that existing relationships would be an important resource to draw on it is not clear from the paper, how would the boundaries of a network (as a site of implementation) be defined, and what are the implementation strategies that could be adopted. This links to a further point, about offering examples that could illustrate the latter. Actually, the authors briefly refer to this a bit further (p.17 para 3), but it would seem to me that developing these examples and adding some further reflections about the possible difficulties that could be expected from such an approach would be of interest to the readers of the paper.

In the methods and discussion section of the revised manuscript, we note that two-thirds of the network ties existed among individuals from different agencies and different counties. We also note that the largest network component included individuals from 10 of the 12 counties, while individuals from 3 counties were represented in two or more unique components. We focus on the importance of
networks as a resource and of collaboration in the process of implementation, noting that neither of these two elements is confined to single agencies or even counties.

Reviewer #2:

1. I had a question on the relation upon which the network was created—the authors indicate they used ‘relied to for advice about whether and how to use EBPs for meeting...’ It seems that this may be tapping two forms of advice—whether to select a particular and how to use—did the authors use the qualitative data to better understand if this relationship was capturing ‘both’ aspects of the advice relationship or whether respondents focused more on one or the other.

The reviewer makes a valid point; our social network survey focused on advice about whether and/or how to use EBPs. This broad definition of advice represents a limitation in the social network portion of our study because we are unable to discern the exact nature of the EBP advice relationship. In our qualitative interviews a range of types of advice seeking were discussed – some individuals described multiplex relationships that included discussions of both whether to use a particular EBP and also how to best implement EBPs to best meet the needs of children in their county. However, some participants more generally mentioned individuals with whom they discuss implementation of innovative programs. To address the reviewer’s comment, we have added a short description of the different types of advice seeking that were communicated in the qualitative interviews (p. 13).

2. I found the choice of network measures to be appropriate for the study. However, I was left wondering—there are a number of commonly used measures that could be used in network analysis. The authors have selected a number of very typical network level measures (density, distance), which seem appropriate. However, I would have appreciated a bit more clarity on what theoretical/research question/empirical basis that the authors privileged those measures and not for example network ‘centralization’.

As suggested by the reviewer we have added an explanation regarding our choice of network metrics (p. 9 and p. 10). Our intention with the network-level measures was to capture a descriptive picture of the network across several common dimensions which are easy to interpret. As the reviewer suggests, we could have selected many others, but settled on these based on the analysis of the qualitative interviews which suggested these metrics to be the most salient.

3. I have the same question regarding ego level measures. More detailed grounding as to why those measures were selected, when one might expect others might be used such as ‘betweenness’ given one could consider implementing EBP as a type of innovation? I also wondered about ‘homophily’, was there some reason to hypothesize that leaders would select similar others? Once again, I find these measures reasonable, but would value a bit more on what drives the selection—I think this is particularly useful for readers as the application of social networks is relatively new in this area.

As suggested by the reviewer we have added an explanation of our choice of network measures (pp 9-10). We also explain that we did look at betweenness and closeness, but they yielded non-significant results (p. 9). We selected these metrics to assess homophily because we hypothesized that persons in relative proximity to one another (i.e., same agency or same county) would be more likely to communicate. Moreover we hypothesized that organizations at similar levels of MTFC implementation would be more likely to be in contact with one another, in part due to their shared stage of adoption.
4. In regard to the regression models—why in and outdegree and not some other network measure—it seems a reasonable choice, but one could also make arguments that one or the other or indeed other measures may be important to consider such as ‘closeness’ or ‘betweenness’. The authors do provide some grounding initially, but reconnecting to that work would assist the reader in really understanding this unique method.

As per the suggestion of the reviewer, we have expanded our discussion of why we examined some measures and not others (pp 9-10).

5. I also wondered if other additional variables were included in the model? The authors indicate they collected some additional demographic data as well as homophily scores, were those also included in the models? I realize the authors are bumping up against statistical power issues. It seems the models are pretty parsimonious, but as such additional acknowledgement is warranted as the models may well be missing some other important predictor variables.

As noted by the reviewer, we lack statistical power to model a large number of variables simultaneously. In addition, the 176 node network is reported on by 38 interviewees, so we lack individual-level measures on some of the nodes who were not directly interviewed.

6. As for in and outdegree it seems these may be tapping very different takes on ‘status’. Would one have any reason to think that these qualities may be associated with different stages, not just both for every stage? As a reader I would value some more clarity on why both are included in the models as predictors?

Although we did not test this because we found no evidence in the qualitative interviews to suggest this, we now suggest this possibility on p. 19 of the revised manuscript.

7. In and out degree are often highly correlated (as can be the case in many other ego level measures), as such how did the authors account for this in their models.

As we now explain “In-degree and out-degree centrality need not be correlated, and in this network are not. In-degree captures the status of a node in a network by assessing how frequently that node is nominated by others in the network. This measure reflects how important others in the network perceive a given node to be. Out-degree assess the involvement of a node in a network, by measuring how many others a given node nominates, which may have little to do with how other’s in that network perceive that node” (p. 9)

8. How did the authors handle missing network data?

We did not have any missing structural network data (i.e. who nominated who). We do have missing individual-level data which impacted our decisions about which covariates to assess. For example, we do not know the positions occupied by most nominated (but not directly interviewed) nodes and hence this covariate could not be used. County size, urban/rural, and ebp stage data were available for any node which was a person in a county organization.

9. I also wondered if the authors assessed the ‘strength’ of the relationship between actors and if so was that related to outcomes. This may be of interest as the authors further point to ‘brokers’ of knowledge.
Sadly, we do not have a measure of tie strength, but agree that it would be valuable to future research.

Results

1. It would have been helpful to have the nodes in the sociogram sized by in and outdegree as those were important in the overall results (I realize this requires creating an additional sociogram), but it would provide added value to the thoughtful analysis.

While some social network studies have chosen to represent varying levels of in-degree and out-degree by node size, we made an explicit decision to not use this method. Our reasoning stems from the fact that arrows within the sociogram indicate in-degree and out-degree for each participant in the study.

2. Unfortunately, the color of the nodes is not apparent in my copy of the article—can the authors use greyscale to assist readers who may not have access to color copies of the study.

Since Implementation Science is published online and subscribers will have access to a color version of the manuscript, we prefer to keep the network diagram in color. We tried creating a greyscale version of the sociogram but it seemed more difficult to read and interpret than the color version. However, we will defer to the wishes of the editors regarding this point.

3. The finding of ‘indegree’ being associated with implementation seems not very surprising given the network question was about ‘how to use’ EBPs for mental health needs. What is a bit surprising is that it doesn’t predict higher stages of implementation I would expect this would be further discussed in the discussion section.

We are a little confused by this comment. In-degree centrality was a significant independent predictor of higher stages of implementation. We note in the discussion section that such individuals are relied upon by others as resources because they have both greater experience with implementation and greater resources to implement. They constitute the opinion leaders that others rely on for advice. Consistent with the findings of other studies in other contexts, such opinion leaders are more likely to adopt innovative practices, which is precisely why they are viewed by other systems leaders as a resource.

Discussion

1. The point around ‘opinion leaders’ is a good one, there is also some work to suggest that opinion leaders are represented by more than high indegree, I would value some acknowledgement of the limitations of assessing ‘opinion leaders’ just using measures of indegree.

We appreciate this reminder. Indeed, Burt has made much of the role of bridging ties in opinion leadership and we have addressed this in the discussion (p. 18-19).

2. I really value the discussion around the idea of building ‘influence’ networks and examining existing networks as being supports or constraints for implementation. I think that there are also some additional issues to be considered. For example, well connected networks can move not only ‘good’ information related to implementation, but also these networks can also move information that runs counter to implementation—the ‘dark side’ of social capital if you will. How might this play out in this work?
We include a sentence in the results section (p. 13) that a few of the study participants did cite instances where they were dissuaded from adopting a specific program because of information and advice provided by trusted others. We were unable to identify instances where systems leaders were dissuaded by inaccurate information. However, we did identify instances where leaders were informed by others that the costs of implementation might be prohibitive.

Reviewer #3:

1. Sampling and boundaries of network. My understanding is that the network study aimed at a complete network of directors and equivalent persons: this should be explicitly stated. The study sample resulted from purposeful sampling, which started with 45 directors in 13 counties of whom 38 participated. They were asked to list up to 10 individuals, resulting in a total of 176 individuals. More detail is needed regarding the exact procedure (from 45 tot 176) and regarding the criterion for stop further sampling: was this some type of saturation?

We have added a sentence reflecting that the network study aimed to gather a complete network of agency directors (p. 6). We have also added a sentence in the methods section, which describes how web-based social network data was supplemented by data gathered from qualitative interviews. It was this process, which expanded the size of the network from 45 to 176. All relevant names mentioned in qualitative interviews were added to the web-based survey dataset – saturation was not a criteria for adding names.

2 Content of connections. The content of the connections between individuals was not clear to me. This are referred to as ‘influence’, ‘advice’ and ‘collaboration’. These are different things and may relate to different objects. Also, it is confusing that qualitative data were also used to construct matrices. Please clarify the content of the connections studied. Note that the individuals might have different networks with each other, one for each type of content.

The content of connections described in the study are multiplex. They include ties that relate to information, advice, and implementation in EBPs. Reviewer 2 had a similar question about discerning the content of interactions between individuals. We have addressed this concern above, and acknowledged the limitation of our study to decipher the exact content of advice-seeking by participants.

3. The use of network analysis is relatively new in implementation research, but examples do exist. For instance, the authors should check the publications in the journal Implementation Science. It would be desirable to elaborate on hypotheses or ideas on the potential impact of the selected factors on implementation processes, particularly homophily and degree centrality. Why were the network coefficients selected, out of many others that could also have been calculated?

As suggested by the reviewer we have a more comprehensive discussion of our selection of these measures (p. 9-10).

4 The regression analyses should be elaborated. Did these include random coefficients (for counties and organizations)? Were these linear or logistic? At what level of aggregation were network measures specified; degree centrality can be defined for individuals and for networks.

As suggested by the reviewer, we have expanded our discussion of our modeling strategy (p. 10). Social network data inherently involves non-independent observations and presents a challenge to statistical
analysis. While some highly advanced models have been proposed to deal with this issue (e.g. employing Markov Random Fields or Kernel-based Regression (Kolaczyk, 2009), the most common approach is to use a program like Ucinet to generate position specific variables which can be exported to the original individual-level database and analyzed with standard linear models [e.g. Moody and Bearman, 2004]. In cases where the outcomes occur at the level of the tie (not the level of the node), hierarchical linear models with random-effects can be employed [e.g. Christakias and Fowler, 2007], but as autocorrelation was not found in our data, the issue of independence is primarily a conceptual one.

5. It is stated that qualitative research can provide in-depth understanding as opposed to quantitative research. However, I had difficulty in identifying the added value of the qualitative research and its link to the quantitative research. The authors should try to relate the qualitative and quantitative study more explicitly. The ‘mixed-methods’ design as it stands is more like two studies in one paper.

We have provided more explanation of the linkage between the quantitative and qualitative results in the methods section (see p. 5 of the revised manuscript).

6. I am happy to read the Discussion after the requested clarifications have been made. Currently, I find it difficult to assess it given the many questions I have regarding the study.

We would greatly appreciate the reviewer’s offer to re-read our paper and offer additional feedback.

Minor comments:

-p3 Are ‘champions’ are ‘trusted others’ equivalents as suggested?

To the extent that both serve as advocates for innovation, champions and trusted others are equivalent. They are distinct in the sense that champions exercise more of a leadership role in the implementation process while trusted others play more of an advisory or support role.

-p4 ‘influence networks’ and ‘influence of these networks’ seems tautological.

We have changed “influence networks” to “information and advice networks.”

-p4. Rephrase ‘currently funded trial’ as this may not be current anymore at the time of reading

We have removed the words “currently funded.” The sentence now reads: “The present study uses data from the Cal-40 Study, a clinical trial of an implementation strategy to scale-up the use of an EBP for treatment of externalizing behaviors and mental health problems (R01MH076158-01A1) [19, 20]” (p. 3).

-p7 ‘indegree centrality’ may indicate different concepts, not just status

We have augmented our discussion of in and out degree centrality: “In-degree captures the status of a node in a network by assessing how frequently that node is nominated by others in the network. This measure reflects how important others in the network perceive a given node to be. Out-degree assesses the involvement of a node in a network, by measuring how many others a given node nominates, which may have little to do with how other’s in that network perceive that node.”
p10. ‘Large counties ..reported” rephrase into ‘individuals in large countries etc.’ to avoid ecological fallacy

We have made the requested revision.

p11. ‘Analysis of interviews... based on roles ...’ please clarify what ‘based on’ exactly means

By “based on” we meant to say that systems leaders develop and maintain information and advice networks according to their position in their particular agency. We have revised this sentence accordingly.

p14 the first paragraph seems to refer mainly to the qualitative part, but should reflect the complete study

We have revised the first paragraph of the discussion section to reflect both quantitative and qualitative findings.

We wish to thank the reviewers for their thoughtful and helpful comments. We believe our efforts to respond to these comments have resulted in an improved manuscript. We look forward to hearing from you at your earliest convenience.

Sincerely yours,

Lawrence A. Palinkas, Ph.D.
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