PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Formalization and subordination: A contingency theory approach to optimizing primary care teams
AUTHORS	Contandriopoulos, Damien; Perroux, Mélanie; Duhoux, Arnaud

VERSION 1 – REVIEW

REVIEWER	Allison A. Norful PhD, RN, ANP-BC Columbia University School of Nursing
REVIEW RETURNED	15-Jul-2018

GENERAL COMMENTS	**INTRODUCTION** The introduction does a nice job demonstrating the variability of primary care team infrastructure and the unpredictability of processes and autonomy within teams. **Page 2 Line 30** Specify early here that "nurse" is referring to an advanced practice nurse/nurse practitioner when describing nurse-centric teams to bring context to the team dynamics. (Due in part that registered nurses also play a large role on interprofessional primary care teams). **CONCEPTUAL FRAMEWORK** **Page 4 Line 3** In regards to the sentence "However, today the autonomous physician's office..." I believe you are referring to physician offices that are free-standing or not integrated into a large system or hospital infrastructure. Initially when reading this, the sentence implied that physicians do not have autonomy any more but actually physicians can practice autonomously within their team role regardless of organizational affiliation. I would suggest changing to "independent" or "solo" or "non-affiliated" physician's office. Or in the context of physicians not practicing in team, "independently practicing" **Page 6 Line 38** "We also used a rough estimate of team size...". It would help to know more detail about how the sites were categorized. Was "team size" all team members including support staff, RNs, clerical staff or was the "team" only the number of physicians and nurse practitioners? **Table 2** "Physicians and nurses should contribute to decisions regarding the hospital discharge of patients." This question seems

	very specific to acute care rather than primary care. Please clarify why this question is pertinent to the primary care role in some practices. There may need to be a brief explanation of cross-setting roles among primary care physicians and nurses. **DATA AND METHODS** **Page 6 Line 55** More detail is needed about selection of sites. How was "highly interprofessional" defined? What is considered "high levels of effectiveness and efficiency"? For example, was it a specific ratio of physicians to nurses...or rather a purposive convenience sample that had a certain number of nurse practitioners? Was the effectiveness of a site supported by quality of care data or benchmarked outcomes? **Page 7 Line 7** Can you provide a little more detail about the interviews with sample of informants? Who were they? How many physicians vs. NPs, vs administrators? What is an example of a specific question asked during the interview? Can you clarify examples of the data that were extracted from each transcript to describe the sites? **Page 8 Line 3** For the purpose of reproducibility and to understand the context of these selected sites, team/site demographics (possibly in the form of a table) would be very helpful. The authors mention the difficulty of categorizing team size. It would be helpful to understand the "rough score of 1 to 4". Such as... categories of team size; number of physicians; number of nurse practitioners; whether the site was affiliated with a larger organization; geographic setting (urban vs. rural). Were any demographics of the physicians and nurses obtained (e.g., years of experience; highest degree of education)? Overall, More detail about the statistical analysis of the data is warranted prior to discussing the findings. **TABLE 3** The columns should have a title. I'm assuming these abbreviating are the codes for each site which was initially confusing because there is no key. In contrast, you could use "Site 1" "Site 2a" "Site 2b"...etc **CONCLUSION** The overall purpose of the study was to demonstrate the application of the contingency theory to study primary care interprofessional teams. Use caution in the conclusion section about overemphasizing the likelihood of autonomy in certain team sizes because little detail and statistical modeling was used to come to this conclusion. **REFERENCES**

	Other than the historical and methodological citations, some of the references seemed outdated. There is more current literature that examines the organizational climate of nurse practitioners and their role in primary care teams that could strengthen some of the discussion. (Buerhaus; Poghosyan; Bodenhemier) **Very interesting manuscript. I believe it will be of interest to a wide audience of researchers, policymakers, and clinicians.**

REVIEWER	Kelly Gleason Johns Hopkins University School of Nursing, United States
REVIEW RETURNED	03-Sep-2018

GENERAL COMMENTS	The strengths of this article are its theory-based analysis of interprofessional care teams to determine what structures and processes best optimizes care teams. While the topic of this article is important, this manuscript would benefit from major revisions prior to publication. Further details on the methods used in this article are needed to interpret the results. The data were collected through qualitative means, but the results focus on a qualitative analysis. The research team placed a quantitative value based on their impression of the qualitative interview. Thus, details on what was done to limit bias are very important in order for the reader to interpret the results. Editing for style and grammar would additionally benefit this paper, the introduction contains substantial information about a narrative review that is already available to readers elsewere. Abstract: I recommend the authors use more specific language in the design on the study. “The study was mostly exploratory and based on correlation analysis” does not tell the reader what was done, thus it was difficult to interpret the results. Similarly, the results contain no values to allow the reader to determine the strength of the negative covariation or the positive association with formalization. The results should be objective, the statement that the findings validate an idea belongs in the conclusion. Introduction: The introduction would benefit from editing for style. The run-on sentences made it difficult to grasp the main point unless the sentences were reread. There is limited content in the introduction on the importance of understanding how interprofessional care teams work, which, from my understanding, was the main point of the article. Conceptual framework: This section read like its own, separate manuscript since it contained the results of a narrative review. The authors conducted a narrative review on high-performance nurse-intensive primary models, which they cite. The level of detail shared about the narrative review seemed extensive, particularly considering that the review is already available for the readers to look up elsewhere. The level of detail in the conceptual framework section made it difficult for the reader to understand if this was supposed to be part of the introduction, versus its own effort that needed a more formal methods section. One idea would be to shorten and simply this section to show the readers the main concepts, and then share the tools used (Table 1 and 2) in the methods section, which I believe is the more appropriate place for those tables. This would require significant restructuring, but would strengthen and clarify your paper.

	Methods: Assigning scores based on the research team's impression based on the interview seem open to bias. Details on level of agreement across reviewers of the interview transcripts would be helpful, since the analyses were based on the score assigned by the researchers' impression of the interview. A smaller issue is that it's unclear why knowing the length of the narrative profile "about 20 single-spaced pages long" is important for the readers. Results: Semi-structured interviews were conducted with 75 total participants, which indicates that there is ample qualitative data. However, the qualitative data are not presented, the results are limited to the quantitative analysis results of the research team's scores given to the interviews. It feels like there is a mismatch between the methods and the results. Discussion: The main limitation I see is that is the research team determined the quantitative score based on interviewees' qualitative interviews, and this leaves the entire process open to bias unless further detail about the level of agreement across reviewers/numbers that has to be resolved by consensus is shared.

VERSION 1 – AUTHOR RESPONSE

REVIEWER 1:

The introduction does a nice job demonstrating the variability of primary care team infrastructure and the unpredictability of processes and autonomy within teams. Page 2 Line 30 Specify early here that "nurse" is referring to an advanced practice nurse/nurse practitioner when describing nurse-centric teams to bring context to the team dynamics. (Due in part that registered nurses also play a large role on interprofessional primary care teams).

We agree that such precision is important and have edited the text.

Page 4 Line 3 In regards to the sentence "However, today the autonomous physician's office..." I believe you are referring to physician offices that are free-standing or not integrated into a large system or hospital infrastructure. Initially when reading this, the sentence implied that physicians do not have autonomy any more but actually physicians can practice autonomously within their team role regardless of organizational affiliation. I would suggest changing to "independent" or "solo" or "nonaffiliated" physician's office. Or in the context of physicians not practicing in team, "independently practicing"

We also agree and edited the text accordingly.

Page 6 Line 38 "We also used a rough estimate of team size...". It would help to know more detail about how the sites were categorized. Was "team size" all team members including support staff, RNs, clerical staff or was the "team" only the number of physicians and nurse practitioners?

This is an important issue raised by both reviewers. We agree and invested a very significant effort to strengthen the paper in regard to the measure of team size. We went back to the three sub-dimensions of size that we relied on initially ("organizational size, physical location site size, and practice model were therefore all taken into account and summarized as a

rough score of 1 to 4") and instead operationalized them as three independent scores based on descriptive claims.

We then went back to the data and reanalyzed team size based on those items ("we estimated practical team size based on three factors: size of the overall organization (0-10 FTE =1; 20-50 FTE =2; 50 and more FTE =3); size of the care delivery site (0-5 FTE =1; 5-15 FTE =2; 15 and more FTE =3) and level of interdependency in daily practice within the team (minimal=1; moderate=2; high=3)"). We relied on the same score attribution approach used for formalization and autonomy. The resulting team size scores were significantly different than the previous ones. However, we believe the new scores to be more accurate and transparent than the previous ones in part because the first two items of the scale are highly objective (and also provide relevant information about each site).

Table 2 “Physicians and nurses should contribute to decisions regarding the hospital discharge of patients.” This question seems very specific to acute care rather than primary care. Please clarify why this question is pertinent to the primary care role in some practices. There may need to be a brief explanation of cross-setting roles among primary care physicians and nurses.

We believe that there is a misunderstanding here. The statement "Physicians and nurses should contribute to decisions regarding the hospital discharge of patients" is the original statement from Hojat et al. (left side of the table). We edited it for "Nurses can treat and send a patient back home without asking permission from a physician" (right side of the table). Stated this way, it is something that definitely makes sense given our data. In some practices, a patient who comes either for an appointment or as walk-in will always see a physician. No other professional will have the authority to autonomously treat the patient (or suggest no treatment is needed). In other practices, some patients won't see a physician during their visit and instead obtain services from NPs or RNs.

Page 6 Line 55 More detail is needed about selection of sites. How was “highly interprofessional” defined? What is considered “high levels of effectiveness and efficiency”? For example, was it a specific ratio of physicians to nurses...or rather a purposive convenience sample that had a certain number of nurse practitioners? Was the effectiveness of a site supported by quality of care data or benchmarked outcomes?

We edited the paper to provide more details on those elements.

Page 7 Line 7 Can you provide a little more detail about the interviews with sample of informants? Who were they? How many physicians vs. NPs, vs administrators? What is an example of a specific question asked during the interview? Can you clarify examples of the data that were extracted from each transcript to describe the sites?

We agree on this. The paper now states that we conducted 73 interviews with a total of 53 informants (15 physicians, 9 NPs, 18 RNs and LPNs, 4 administrators, 8 other professionals such as social workers and psychologists). We also included a summary of the main themes of the interview grids.

Page 8 Line 3 For the purpose of reproducibility and to understand the context of these selected sites, team/site demographics (possibly in the form of a table) would be very helpful. The authors mention the difficulty of categorizing team size. It would be helpful to understand the “rough score of 1 to 4”. Such as... categories of team size; number of physicians; number of nurse practitioners; whether the site was affiliated with a larger organization; geographic setting (urban vs. rural). Were any demographics of the physicians and nurses obtained (e.g., years of experience; highest degree of education)?

The paper now offers more details about sites in Table 3 (organization size and team size) as well as a detailed list of who was interviewed and the nature and location of sites in the "Data" section.

Overall, More detail about the statistical analysis of the data is warranted prior to discussing the findings.

In line with the comments of the second reviewer, we significantly edited the paper structure. The methods section was modified and strengthened accordingly.

The columns (from table3) should have a title. I'm assuming these abbreviating are the codes for each site which was initially confusing because there is no key. In contrast, you could use "Site 1" "Site 2a" "Site 2b"...etc

We edited the table to add a key pertaining to site names.

CONCLUSION The overall purpose of the study was to demonstrate the application of the contingency theory to study primary care interprofessional teams. Use caution in the conclusion section about overemphasizing the likelihood of autonomy in certain team sizes because little detail and statistical modeling was used to come to this conclusion.

We made sure that the conclusion did not venture into unsubstantiated claims of this nature and edited the abstract to this end.

REFERENCES Other than the historical and methodological citations, some of the references seemed outdated. There is more current literature that examines the organizational climate of nurse practitioners and their role in primary care teams that could strengthen some of the discussion. (Buerhaus; Poghosyan; Bodenhemier)

Thanks for the suggestions. We read the last two years' worth of publications from those authors. Some of the papers were known to the team and some weren't. We also searched for other relevant and up to date publications and improved the literature review of the paper.

Very interesting manuscript. I believe it will be of interest to a wide audience of

researchers, policymakers, and clinicians. Thanks :-) REVIEWER 2:

The strengths of this article are its theory-based analysis of interprofessional care teams to determine what structures and processes best optimizes care teams. While the topic of this article is important, this manuscript would benefit from major revisions prior to publication. Further details on the methods used in this article are needed to interpret the results. The data were collected through qualitative means, but the results focus on a qualitative analysis. The research team placed a quantitative value based on their impression of the qualitative interview. Thus, details on what was done to limit bias are very important in order for the reader to interpret the results.

We very significantly reworked the paper to strengthen the presentation of the method as well as the way through which the scores were established and validated.

Editing for style and grammar would additionally benefit this paper, the introduction contains substantial information about a narrative review that is already available to readers elsewere.

We reviewed the style and grammar and edited the paper to remove information available elsewhere and not relevant here.

Abstract: I recommend the authors use more specific language in the design on the study. "The study was mostly exploratory and based on correlation analysis" does not tell the reader what was done, thus it was difficult to interpret the results. Similarly, the results contain no values to allow the reader

to determine the strength of the negative covariation or the positive association with formalization. The results should be objective, the statement that the findings validate an idea belongs in the conclusion.

The abstract was edited according to those comments.

Introduction: The introduction would benefit from editing for style. The run-on sentences made it difficult to grasp the main point unless the sentences were reread. There is limited content in the introduction on the importance of understanding how interprofessional care teams work, which, from my understanding, was the main point of the article.

We edited the style and included more details on the goal of the paper in introduction.

Conceptual framework: This section read like its own, separate manuscript since it contained the results of a narrative review. The authors conducted a narrative review on high-performance nurseintensive primary models, which they cite. The level of detail shared about the narrative review seemed extensive, particularly considering that the review is already available for the readers to look up elsewhere. The level of detail in the conceptual framework section made it difficult for the reader to understand if this was supposed to be part of the introduction, versus its own effort that needed a more formal methods section.

We limited the level of detail from the narrative review to the minimum necessary for the reader to understand where our hypotheses came from. Most of the conceptual framework, however, discusses elements that go beyond the narrative review. For example, the short presentation of organizational science contingency theory is specific to the current paper and, in our opinion, useful to the argument.

One idea would be to shorten and simply this section to show the readers the main concepts, and then share the tools used (Table 1 and 2) in the methods section, which I believe is the more appropriate place for those tables. This would require significant restructuring, but would strengthen and clarify your paper.

We followed this advice and deeply restructured both the conceptual framework and methods section accordingly.

Methods: Assigning scores based on the research team’s impression based on the interview seem open to bias. Details on level of agreement across reviewers of the interview transcripts would be helpful, since the analyses were based on the score assigned by the researchers’ impression of the interview.

We agree that the paper would be strengthened by providing more details on the method used to establish the scores. We edited the manuscript accordingly. However, we want to stress that the scores were not based on "the research team’s impression". Scores were based on descriptive claims (such as "and an EHR is used to communicate", "the nurses are involved...") and such claims are either true, sometimes true or false. We believe that the in-depth interviews we conducted provide a more robust appreciation of such descriptive claims than a survey would produce. We modified the structure of the paper and added details on the process used in a new "Score attribution" subsection in the Methods.

A smaller issue is that it’s unclear why knowing the length of the narrative profile “about 20 singlespaced pages long” is important for the readers.

The sentence was edited.

Results: Semi-structured interviews were conducted with 75 total participants, which indicates that there is ample qualitative data. However, the qualitative data are not presented, the results are limited

to the quantitative analysis results of the research team's scores given to the interviews. It feels like there is a mismatch between the methods and the results.

> Actually, there are 53 participants and 73 interviews. After re-examination of their content, we decided not to include in the total transcripts of two focus groups as we could not attribute with precision who was involved. The paper now states that we conducted 73 interviews with a total of 53 informants (15 physicians, 9 NPs, 18 RNs and LPNs, 4 administrators, 8 other professionals such as social workers and psychologists). We also significantly edited the methods section to include more information regarding the focus of the interviews so that our approach is clearer.

Discussion: The main limitation I see is that is the research team determined the quantitative score based on interviewees' qualitative interviews, and this leaves the entire process open to bias unless further detail about the level of agreement across reviewers/numbers that has to be resolved by consensus is shared

> We agree that this information is important. We included the number of items for which there was a discrepancy, the percentage it represents and the way in which those were resolved.

VERSION 2 – REVIEW

REVIEWER	Allison A. Norful PhD, RN, ANP-BC Columbia University School of Nursing; United States
REVIEW RETURNED	18-Oct-2018

GENERAL COMMENTS	Nicely revised manuscript. The authors did an excellent job addressing all previous comments and suggestions for revision. This work is timely and can lead to significant clinical and research implications. One minor suggestion is to clearly identify whether "formalization" is being measured as a process or outcome (at which times in the study and with what variables). It is defined as both but it appears from the findings that study measures tend to move toward more of a processual formalization rather than an outcome. If this is incorrectly perceived, than further clarification would be recommended.

REVIEWER	Kelly Gleason Johns Hopkins University, United States
REVIEW RETURNED	15-Oct-2018

GENERAL COMMENTS	Excellent revisions. You were responsive to reviewers' comments and I hope you feel that the paper is stronger because of it, I certainly do.

VERSION 2 – AUTHOR RESPONSE

Reviewer 1 suggested that we should be more specific in the description of our conceptualization of formalization:

One minor suggestion is to clearly identify whether "formalization" is being measured as a process or outcome (at which times in the study and with what variables). It is defined as both but it appears from the findings that study measures tend to move toward more of a processual formalization rather than an outcome. If this is incorrectly perceived, than further clarification would be recommended.

We agree that the measures we used mostly aim at measuring a processual conception of formalization. However, the distinction isn’t as straightforward. The work of Hall from which we built our scale rest on the causal assumption that rules and procedures aimed at increasing behaviour predictability are a good proxy of actual human processes and therefore a predictor of formalization outcomes. To address the comment, we added sentences that deal with this question both in the conceptual framework section and in the method section.

We also want to say that we agree with reviewer 2 that the peer reviewing process was extremely helpful in improving the quality of the article and that we are sincerely grateful for this.