A Review of Personal Attitude Construct (PAC) Studies in Various Disciplines:

The Usage of Stimulus Prompts

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When any major research project is undertaken, a researcher begins with an observation or a question. The researcher sees something he or she wants to explore further. Wisker (2009) states that "Research is about asking and beginning to answer questions." Once the researcher has identified the area to investigate, a formal research question must be carefully crafted with an accompanying hypothesis. According to Frankel and Devers, researchers should aim to provide answers to their research questions that will alter others' fundamental understanding of the problem or the field (2000). Once these conditions have been established, the researcher then begins to gather data. At this juncture, the researcher must decide what method for collecting data is best to test his or her hypothesis and ultimately answer his or her question.

Sometimes a researcher will use a method that has been used by other well-known researchers. Other times, researchers will try to combine approaches from similar disciplines, to better meet their own individual research needs or design. Still, other researchers may choose a research method based on a particular method's appearance or uniqueness. Ultimately, to select the best method or methods, researchers must examine a broader base of previous research to see how methods are used in practice.

To both readers and researchers, what has been described thus far seems like a simple and straightforward path known to everyone. However, what is often unknown to readers is how much time and energy the researcher has given to evaluate the method or methods used in his/her research. It is also unknown how often researchers look to seemingly unrelated research disciplines for both beneficial advice and possible pitfalls when selecting research methods. Walliman (2017) suggests the importance of conducting interdisciplinary research, "[a researcher can] ... make links across discipline boundaries when doing an interdisciplinary review, rather than keeping each separate and examined in turn. You may even suggest some new links that need to be investigated." The research of research methods or "methods research" is useful in analyzing a method to be used in future research.

This paper describes the research method called Personal Attitude Construct Analysis, also known as PAC Analysis or PAC 分析 (bunseki) in Japanese. PAC Analysis, created by a Japanese scholar, is a hybrid of quantitative and qualitative methods and

shares its foundation with a form of participant-driven cluster analysis and subsequent accompanying interviews (Naito 2003). One of the key components of PAC Analysis is a stimulus prompt that is given to participants. Participant responses from the prompt are then transformed into dendrograms, a kind of pictorial representation, used as a base for later interviews. Within the scope of this paper, a general overview of PAC Analysis will be given and then, the stimulus prompts from 10 different studies will be reviewed. The stimulus prompts will be categorized and analyzed based on common versus unique characteristics. In sum, this exploratory paper of methods research looks to investigate a variety of research reports in different fields that have used PAC Analysis. The reader can infer whether PAC Analysis is suitable for his or her research needs.

What Is PAC Analysis?

Personal Attitude Construct (PAC) Analysis was created by Professor Tetsuo Naito of Shinshu University in the early 1990s. Professor Naito is a well-known Japanese-researcher in the field of psychology specializing in social and clinical psychology. He has used PAC Analysis in his research over the past 30 years. He has written on various topics that range from classroom climate (1993) to sexual need and behavior (1994) to gender attitudes (2003). Naito created PAC Analysis out of the desire to "visualize an individual's inner world" (Sueda 2014) and simultaneously offer a form of beneficial assistance to participants. Considering the field of clinical psychology, by definition, many participants in research studies themselves are currently undergoing counseling or seeking medical care. PAC Analysis can be used with possible therapeutic applications for participants (Inoue 1998). In one example, a majority of those who were participants in suicide research reported a decrease in suicidal thoughts and activities (Cukrowicz, Smith, & Poindexter 2010). By partaking in research that utilizes PAC Analysis, participants can gain a better understanding of how they feel about a topic.

In some cases, the topic being researched when using PAC Analysis could be an uncomfortable one (such as sexual relationships or the previously given example of suicide). Due to PAC Analysis's methods, the participants can shape the data being produced. The procedure will be explained in detail in the next section, but it is important to note that all components of PAC Analysis are participant lead. From the multiple responses that create the cluster analysis to the open-ended interview data, all components come from the participants.

The data gathered from PAC Analysis allows the researcher to look deeply at an individual participant's belief about a specified subject or issue. PAC Analysis can be used in a clinical setting because it allows participants to organize their feelings and relay them to the researcher with minimal intrusion from the researcher. However, PAC

Analysis is not limited to clinical psychology. It has also become popular in the field of education, mainly Japanese as a Second Language (Fujita 2007, Furubeppu 2010, Seo 2012, Song 2011) for both teacher-focused research and learner-focused research. This popularity is likely due to PAC Analysis's ability to provide rich data in a research setting such as second language education, which has an overwhelming number of variables. Within any educational research, it can be difficult to control for variables because education occurs in a highly contextualized environment. PAC Analysis acknowledges this environment and looks within the individual to understand why he or she thinks and feels the way he or she does about the researcher's topic.

Procedure

PAC Analysis has been described as mixed methods because of its combination of statistical data and qualitative interview data. The quantitative data comes from a distance measurement of closeness or relatedness to participant produced item pairs. The qualitative data can be found in open-ended interviews where participants are asked to interpret a pictorial representation (in the form of a dendrogram) of the data they supplied in the previously mentioned quantitative portion. For better understanding, the process has been divided into four parts: (1) Crafting a Stimulus Prompt, (2) Gathering and Organizing Data, (3) Dendrograms, and (4) Interviews.

Part 1 – *Crafting a Stimulus Prompt*

Before finding participants and gathering data, the researcher who will use PAC Analysis must create a stimulus prompt. The stimulus prompt is critical for the data collection. What follows is an example of Naito's stimulus prompt from his 1994 study of classroom climate.

Japanese
はじめにこれまでに担当してきた学級の中で、1年間を通して最も運営に失敗した学級を思い出させた。つぎに、その学級の運営に関連する重要な特徴やイメージを思い浮かべさせ、思い浮かんだ順にカードに記入させた。

English (Translation)
First, considering your entire teaching career, please remember the most difficult class in which you failed to manage it for an entire school year. Next, think of any important characteristics or images that come to mind and write them down on the cards in the order in which you think of them.

Crafting a stimulus prompt can be a difficult undertaking. The researcher must ask

questions that will engage participants and allow them enough freedom to explore the topic without limiting their responses. In the above example, Naito chose to focus on a single case of classroom management. It is written in such a way that the participant can recall specific episodes (in this case loss of classroom management), but the prompt also allows the participants to think about the more significant issues present in overall classroom management.

Part 2 – *Gathering and Organizing Data*

Once the stimulus prompt has been carefully decided and participants selected, the participants are asked to read the prompt and respond. The free response should flow naturally with the participant's line of thinking. Participants should write ideas/items/ terms as they think of them without worrying about order, length or complexity. Naito recommends for participants to use a pen and to write directly on small pieces of paper. This deliberate slowing down of the process allows participants more time for introspection and answer creation. Naito often recommends an analog approach to PAC Analysis because the increase of time required for thinking of a response, writing the response down, reflecting over the response and grouping/sorting multiple responses allows the participant to think more deeply. The participant must "catch up" with his or her thinking by writing the responses down.

Conversely, other researchers have developed interactive software and editable spreadsheets that allow participants to input their responses in digital format for easier analysis. Managing data input for both written responses and later numerical measurements can be time-consuming. One researcher, Yoshio Tsuchida of Kanazawa Institute of Technology who has worked with Naito, has tried to digitally recreate the feel of writing on paper or cards by allowing the participants to manipulate the software/ spreadsheets through dragging and dropping responses with a mouse or trackpad. Tsuchida has aptly named his software PAC Assist, as it assists with data collection and analysis.

The digital and analog differences are important to be aware of, but recently some researchers opt to use digital versions of PAC Analysis. By doing so, it lessens the burden of writing 20-30 responses to a prompt for participants and allows researchers to process data faster to proceed to the interview portion. While it is important to investigate both digital and analog formats, this researcher plans to use a digital approach. Therefore, the remainder of this PAC Analysis explanation will also focus on using a digital version, namely Tsuchida's PAC Assist to collect and analyze data.

Once the participant has thoroughly responded to the stimulus prompt, he/she then is asked to order all the items they have listed. Simultaneously, the items should be

categorized as possessing positive, negative, or neutral aspects. Tsuchida's PAC Assist will then present the participant with pairings of the topics he/she listed in the previous stage. For example, the participant in Naito's 1994 study of classroom climate listed the following items:

"darkness"
"feeling like a robot"
"wanting to return home"

The software presents pairs of all the responses, such as "darkness & feeling like a robot"; "darkness & wanting to return home"; "feeling like a robot & wanting to return home." The participant is asked to rank on a scale of 1 -10 how closely he/she feels these two items are related. A benefit of using the digital version of PAC Analysis is that the software can provide a sliding bar that allows the participant to visualize the closeness of the two responses. This segment is the most time consuming and can mildly inconvenience the participant due to the task's repetitive nature. If the participant creates a list of 20-30 entries, the closeness-judgment task can take over an hour to complete. If the participant begins to feel fatigue, it is vital to allow them to take breaks as needed.

Figure 1

Sample Participant Responses

連想刺激文（テーマ）			
What are the roles/actions (both positive and negative) of tutors			

想起順	自由連想語（文） 想起順に上から記入	重要度	イメージ
1	assist writers with their writing	1	+
2	not teach writing	2	-
12	bring writers attentions to academic writing in general not only the text	3	+
4	respect writer's opinions	4	+
6	help writers improve as writers	5	+
11	focus on the bigger structure of the text	6	+
3	listen to the writer	7	+
9	not give native checks	8	-
5	create a relaxing environment for the writers to work	9	+
8	sometimes accept points of view which contradicts what the tutor thinks	10	-
10	not focus on grammar issues	11	-
7	not give answers to writers	12	-
13			
14			
15			
16			
17			
18			
19			
20			

　　Once the participant has completed assessing the closeness of all pairs, the researcher should thank the participant and allow them to leave. The researcher should schedule a second meeting with the participant, to discuss the results. Once the next meeting has been decided, and the participant has left, the researcher can begin to analyze the data and create a dendrogram.

　　First, the researcher should create a table that shows the numerical representation of the participant's perceived closeness ratings. When first creating this kind of table, it often appears triangular. This triangular shape is because when the participant was asked to rank the closeness of item 1 and item 2. He or she was not asked to rank the inverse or the closeness of item 2 and item 1. This omission is another advantage of using software to gather data because the inverse closeness rankings can be determined automatically. The software fills in the gaps and creates a perfectly completed table with the lower left side of the data matching the upper right side of the data.

Figure 2

Completed Data Table (with mirrored data)

|	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	重複グループ化法	ssist wr	not teach	bring wri	respect w	help writ	focus on	listen tc	not give	create a	sometimes	not focus	not give answer
2	assist writers wit	0	0.1	0.1	24.7	0.1	15	0.1	48.5	74.2	29.6	13.1	76.4	
3	not teach writing	0.1	0	7.7	70.5	0.1	7.7	17.8	38.2	100	100	0.1	0.1	
4	bring writers atte	0.1	7.7	0	24.7	0.1	0.1	54.7	0.1	100	100	0.1	24.7	
5	respect writer's c	24.7	70.5	24.7	0	0.1	33.7	6.6	56.6	48.1	0.1	100	100	
6	help writers impro	0.1	0.1	0.1	0.1	0	0.1	0.1	31	100	17.9	0.1	0.1	
7	focus on the bigge	15	7.7	0.1	33.7	0.1	0	100	24.2	100	100	0.1	0.1	
8	listen to the writ	0.1	17.8	54.7	6.6	0.1	100	0	100	15.7	0.1	100	100	
9	not give native ch	48.5	38.2	0.1	56.6	31	24.2	100	0	100	100	55.3	100	
10	create a relaxing	74.2	100	100	48.1	100	100	15.7	100	0	100	100	100	
11	sometimes accept p	29.6	100	100	0.1	17.9	100	0.1	100	100	0	100	100	
12	not focus on gramm	13.1	0.1	0.1	100	0.1	0.1	100	55.3	100	100	0	17.8	
13	not give answers t	76.4	0.1	24.7	100	0.1	0.1	100	100	100	100	17.8	0	
14														
15														

Part 3 – *Dendrograms*

　　With a complete table created, the next step is to create the pictorial representation or the dendrogram. In the past, some researchers have used older statistical software such as HALIBO to import the table of data created in the prior step. The dendrogram that was created was limited to an ASCII text style display. The usage of this text style display sometimes made the dendrogram difficult to interpret both for the researcher and for the participant. It was also difficult for the researcher to insert the dendrogram into his or her research reports. After editing, a researcher might insert the text form of the dendrogram into a word processing document. At times, the dendrogram would "break" within the document and require resizing or reorienting.

　　Recently to alleviate this issue, some researchers have begun to use other statistical software such as R to create easily understandable dendrograms (both vertical and

horizontal versions can be created quickly). The only difficulty for researchers is to have a working understanding of statistical software that some qualitative researchers may not have used before. With the help of some colleagues and online instructional videos, even the author of this paper (who has limited statistical software knowledge) was able to create dendrograms that are more readily understood by both the researcher and participants.

Figure 3

Sample Dendrograms (Created with R)
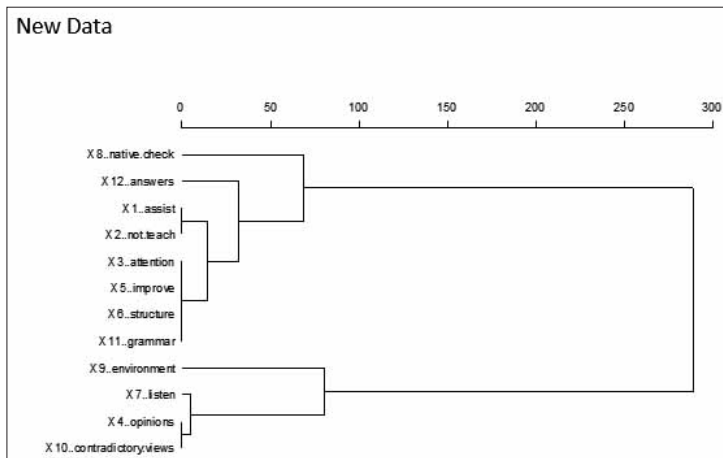
Part 4 – *Interviews*

At this stage in PAC Analysis, a researcher has gathered enough statistical data from participants and has organized it into a visual representation that can be understood by participants. The researcher's next task is to schedule an interview with the participant or participants. Here the researcher should select a location that is suitable for conducting interviews and gives the participants some privacy. The interview will start as a semi-structured interview, but then it will shift to a structured interview with predetermined questions. Some researchers may claim that the second stage of PAC Analysis appears more like a form of recall. However, the participants do not only recall specific events but attempt to explain their inner feelings. To begin the interview, the researcher can start with general demographical and background questions. This action can allow the participant to relax and reduce nervousness or tenseness that may come from participating in an interview.

After general demographical information has been gathered, the researcher should present the dendrogram to the participant. The researcher must allow the participant ample time to inspect the dendrogram. It is difficult to say what is "ample" time needed

for participants to examine the data thoroughly, but the pace of most of PAC Analysis should always be led by the participant. The researcher should only continue with interview questions when the participant appears ready. The researcher can ask the participant to reread the groupings of their answers from the previous data gathering stage. The researcher can also ask the participant to identify groupings or patterns of his or her thoughts represented in the dendrogram. The researcher can also ask for the participant's interpretations of these groups. As with allowing the participant enough time to examine the data, the participant should be given ample time to reflect and think about their answers. The interviewer should refrain from engaging in a conversation with the participant. Naito (2003) has used phrases like "savor" and "relish" to describe the action of the participant during the interview. When a participant has claimed to have fully described in detail the dendrogram, then the interviewer should gently but firmly ask the participant if they can elaborate on their answers. If the participant is unable to elaborate any further, Naito (2003) suggests asking the participant to rephrase their answers or summarize their answers further. This revision of interpretations of the dendrograms allows for a deeper observation into the participant's inner world.

Concerning the interviews, there is some debate as to whether to rely on analog note-taking or to digitally record the audio component of the interview. Naito has suggested that over-reliance on recording devices can alter the researcher's attention to the participant. There is the concern that a researcher may not be as attentive because of the sense that observations not caught during the interview can be reviewed at a later point in time. Inversely, other researchers may worry that they are unable to record multiple, simultaneous, pieces of information from the participants. A suggested compromise is that the researcher should take extensive detailed notes and can use a recording device only as a later supplement to his or her notetaking.

At the end of the interview, the researcher should thank the participant and review his/her notes. The researcher must present a detailed, accurate picture of the participant's inner mind or personal attitude construct. Finally, the qualitative interview data can be compiled, organized and presented in written form with the accompanying quantitative data.

Examples in Use

Now that a general overview of PAC Analysis has been covered, several examples of studies using PAC Analysis will be reviewed. Each study could be analyzed on a variety of levels in greater detail. For brevity's sake, each of the selected ten studies will be summarized with a brief overview, followed by the given stimulus prompt and concluded with some observations about the prompt's features. The articles reviewed were found

through searches on Google Scholar, Elsevier, Waseda University's WINE Catalog, and Tsuru University's ProQuest. All articles were downloaded in PDF format and at the time of creating this review, all were accessible online. The articles were chosen to cover a variety of differences: digital and analog PAC methods, English and Japanese language, education research and non-education research, among others. The order of the articles was partially random and partially due to each article's placement in the online search results. This author tried to gather different articles from different disciplines. Also, due to Naito creating PAC Analysis and because he is most often cited, two of his works appear first.

Example 1 : *Analysis of the personal attitude construct of sexual need and behavior by Naito T. (1994)*

This article was one of the earliest cases of PAC Analysis published in 1994. It is also one of Naito's first formal studies using the phrase "PAC Analysis" in the title. It is written in Japanese, and when searching for PAC Analysis, it is one of the first articles to appear in different search engines. In the article, Naito used PAC Analysis to determine an individual's highly personal attitude construct of sexual need and behavior. The article covered multiple participants and showcased PAC Analysis's ability to look deeply at participants' responses.

The stimulus prompt was

Japanese
あなたは、どのような刺激によって、またどんな場面や状況で性の衝動や欲求を感じやすいでしょうか。

English (Translation)
What kind of stimulation will you feel the impulses and desires of sex in any situation and circumstance?

This stimulus prompt was a single question that asks participants to generalize their thoughts about their unique ways of thinking (in this case – about sexual need or behavior). It is important to note in this first example, that the author did not ask participants to remember a specific incident, but instead asked them to think about all previous experience and then to make a judgment about which instances were most likely to be related back to the main research question. While the prompt is a single question, it uses word pairs of synonyms (impulses and desires, situation or circumstance) to engage the participant. These may be done to widen the scope of what the participant remembers and then uses in their responses but must be done carefully not to overwhelm or distract the

participant.

Example 2 : *Idiographic cluster analysis of the climate of a single classroom by Naito, T. (1993)*

This article, also written by Naito, is an earlier early work (1993) than the previous example (1994). This article written in Japanese is from a different field, education and the researcher asked a participant to remember a specific episode. The researcher instructed participants to use a single incident to organize their thoughts about an internal topic, in this case, classroom management.

The stimulus prompt was

Japanese
はじめにこれまでに担当してきた学級の中で、1年間を通して最も運営に失敗した学級を思い出させた。つぎに、その学級の運営に関連する重要な特徴やイメージを思い浮かべさせ、思い浮かんだ順にカードに記入させた。

English (Translation)
First, considering your entire teaching career, please remember the most difficult class in which you failed to manage it for an entire school year. Next, think of any characteristics or images that come to mind and write them down on the cards in the order in which you think of them.

This stimulus prompt contains several instructions as opposed to a single question. The participant is asked to remember an instance, list the features, and rate their own responses. In some of Naito's later work, instructions are spaced further apart and introduced at different intervals. This omission may be done to allow the participant more time to concentrate on their responses and not to worry about later stages of the analysis.

Example 3 : *Specifying Kansei Requirements with the Application of Environmental Psychology Research Methods Cases of Interior Design in Architecture by Yoshida, T., Maekawa, M., Tsuchida, Y., & Nagai, Y. (2018)*

This article by Yoshida et. Al (2018) was the first article to be used in this paper's research methods review of PAC Analysis that was written in English instead of Japanese. This article appears at the top of English-language searches for PAC Analysis scholarly articles. Another major point of interest about this article is that Tsuchida, the creator of PAC Assist software, is listed as a co-author. The researchers were trying to understand Kansei Design. Kansei Design can be described as giving "attention to the behaviors of

people when they perceive images or objects including products, and study how their personal preferences or cultural bases work to their feelings" (Lee, Harada, & Stappers 2002). Because of the focus on the highly individualized notions of perception, behavior, preference, and feelings, PAC Analysis was a very appropriate method to understand participants' personal attitude construct.

The stimulus prompt was

> <u>English</u>
> Look at these images and tell us any words or images that come to mind on the topic of __(blank)__ that fits your Kansei. Use as many words or images as you like.

In this case, the researchers slightly altered the original framework for creating a stimulus prompt. The prompt is neither a question nor a complete instruction due to the blank or "topic" in the first sentence. This is because the researchers were attempting to understand how participants perceive images or objects about Kansei design. In order to gauge the understanding, pictures were given, and for each picture, the stimulus prompt would change accordingly.

Example 4 : *ケーススタディ: 大学日本語教員養成における実習生から日本語アシスタントまでの成長過程 -PAC 分析を通して Case study: A Case Study: The Developmental Process from Student Teaching Practice to Overseas Assistant Teaching in a University TJSL Course Using PAC (Personal Attitude Construct) Analysis by Furubeppu, H. (2010)*

This article is like Example 3 because of its relation to the field of education. Whereas Naito's study (1993) was on a mid-career teacher, this article was on a pre-service teacher. This article was also conducted in Japanese. The author, Furubeppu, is interested in the perception and development of a pre-service Japanese language teacher who traveled abroad and gained experience working as a language assistant. PAC Analysis seems well suited to this kind of research because it asks the participant to describe his or her feelings about the development or change that takes place.

The stimulus prompt was

> <u>Japanese</u>
> あなたにとって良い日本語教師とは どんな日本語教師ですか

English (Translation)

What kind of Japanese language teacher do you think is a good Japanese language teacher?

This prompt was a single question that repeated the phrase "Japanese language teacher." This researcher did not ask the participant to visualize an incident or memory from the past. It can be assumed that the participant will draw on both their own interactions with "good teachers" and what they assume to be necessary for a "good teacher." One issue that appears when discussing positive items in stimulus prompts is that there can sometimes be an upper limit of what the participant can describe. The previous examples used either a prompt that focused on a negative situation or remained as neutral as possible. Positive stimulus prompts can lead to the participant providing answers that he or she may think the researcher desires.

Example 5 : *Negotiating Multiple Identities, Chapter 5 : Research Methodology and Methods by Sueda, K. (2014)*

This usage of PAC Analysis is not from a single article, but instead from a book chapter that is based on a dissertation. The author, Sueda, uses PAC Analysis to determine how Japanese returnees determine their personal and social identity. Due to the length of the book chapter, there is a great deal of information about the participants and the necessity of conducting this type of research. Sueda gives many reasons why she chose PAC Analysis. Explicitly, she states that "PAC method should allow researchers to discover the complex dynamics underlying negotiation of face and identity by putting the whole into the part and the part into the whole and linking the past, present and future of the research participants" (2014).

The stimulus prompt was

English

Please recall a situation where you felt a tremendous sense of loss or existence of face as the most salient identity. List the words that are important and meaningful in describing the situation. Think of as many words as possible and put each word on one card in the order that the words occurred to you.

This stimulus prompt is a simple instruction that mimics some of Naito's work. The prompt focuses on a negative event and then asks the participant to elaborate further. The participant is also then asked to make more substantial judgments about themselves and the idea of "face" or "loss of face." Sueda also chose to use a non-digital approach and included this in the instructions.

Example 6 : *日本人学生とのやり取りを通した作文授業の影響—PAC 分析 による学習者 理解 (Exchanging Japanese e-mails with Japanese university students: Understanding language learners through personal attitude construct analysis) by Fujita, Y. (2007)*

This research could be more accurately described as action research because it was conducted by an educator in an academic setting (a university level, Japanese as a non-native language course) to improve teaching and learning. One concern that has not appeared in the previous six studies was concern about language level and ability to express oneself. Because this research took place in a classroom setting, students were encouraged to use Japanese when possible despite limited vocabulary. Some students wrote their responses in phonetic Japanese (hiragana without any complex-kanji characters) and/or a mix of English.

The stimulus prompt was

<u>Japanese</u>
「日本語で書く」という言葉から連想される項目を１枚のカードに１つずつ自由 に書く。

<u>English (Translation)</u>
Please write any words associated with the phrase "Writing in Japanese" on the individual cards provided.

This prompt was both the shortest and lacked the specific recall of an incident or incidents. This lack of specificity could be considered the most free-association version of a prompt reviewed thus far. As stated above this could be in part due to language ability. Fujita noted that many of the responses from the participants were concrete, observable items such as a pen, paper or teacher. Researchers should be aware of language limitations when recruiting participants. However, in this case, the researcher could still interpret positive development from the participants over the course of the semester.

Example 7 : *PAC Analysis as a Tool for Evaluating LARP Learning by Kamm, B. (2016)*

This research may be the most unique application of PAC Analysis. LARP is an acronym for Live Action Role Playing and LARP can be used for educational purposes, corporate training purposes, or purely recreational purposes. In this study, Kamm conducted a LARP event at an academic conference. The hypothetical situation was for the "audience to judge citizens for their worth for society and whether they should be allowed to live in the rather safe areas provided by the state" (2016). The data was reported in English.

Upon initial inspection, PAC Analysis seems to be very well situated to LARP research because of the number of judgments a participant must cast. Additionally, the act of role-playing involves externalizing some internal beliefs and feelings. PAC Analysis can readily provide a tool to investigate that occurrence in participants.

The stimulus prompt was

> English
> Please recall a situation during the LARP where you experienced a moral dilemma. List terms or string of words that are important and meaningful in describing this experience. Think of as many words as possible and put each on one card in the order that the words occurred to you."

This prompt was longer, with secondary instructions about the PAC Analysis process. The prompt also matched Naito's work in the second example. Both prompts asked the participant to recall a single experience and extrapolate more significant meaning or a personal interpretation of the topic. This single negative experience type prompt can gather richer data for a study using PAC Analysis. As mentioned before, participants are more likely to discuss experiences that include difficulty (in this case – experiencing a moral dilemma).

Example 8 : *JFL teachers' perceptions of task-based language teaching: A case study of Japanese language teachers in Hong Kong by Seo, M. (2012)*

This report was an extremely brief preliminary study of two native Japanese teachers in Hong Kong and their perceptions about task-based language teaching. While the subjects of the study were Japanese-language teachers, the research was presented in English with a mix of Japanese.

Concerning the research topic, task-bask language teaching focuses on using tasks, such as ordering a pizza or writing a letter. The tasks serve as both the instructional material and the assessment. Task-based language teaching or TBLT is often described as an opposing view of more traditional Grammar-Translation or Audio-Lingual based language teaching approaches. PAC Analysis can be useful for Japanese language teachers who struggle with TLBT and rely on using more traditional methods such as grammar-translation.

The stimulus prompt was

> English

What images do you have about the task?

This prompt was a bit problematic because it did not explain in enough detail what a task was nor did it specify if participants should think about broader issues in TBLT. These key points are impossible to determine this from the prompt alone. However, upon closer inspection of the dendrograms prepared by Seo, one can see that the participants provided very general concepts about TBLT. One improvement to the stimulus prompt could be to expand it with a more detailed explanation of a task or to direct participants to think about specific events or situations in the classroom.

Example 9 : *PAC (Personal Attitude Construct) analysis of subjective adjustment in university students by Okubo, T. (2004)*

This article compared two university students, one who had adapted to university life and one who had not adapted. The research was both conducted and presented in Japanese. The report looked at the concept of *ibashou* (Japanese: 居場所). *Ibashou* can be difficult to translate directly from Japanese but can be best described as a place where one can be or feel like themselves. *Ibashou* can be described as home, or where one can feel at home. Okubo used PAC Analysis to ask the two participants if they could precisely describe why they felt university was or was not their *ibashou*.

The stimulus prompt was

Japanese
あなたはどのような場面や状況で居場所を感じやすいでしょうか。そして居場所を感じているとき、自分がどんな状態どんな状況にあると感じられるでしょうか。またどんな行動をと感じたり、実際に行動しがちでしょうか。頭に浮かんできたイメージや言葉を、思い浮かんだ順に番号をつけてカードに記入して下さい。

English (Translation)
What kind of scenes or situations are easy for you to feel like you can act like yourself? Also, in a place where you can act like yourself, how would you describe your state and situation? Furthermore, what kind of actions do you feel like or what kinds of actions do you usually do? Please list any images or words that come to mind on the provided cards. Also, please number the items in the order you thought of them.

This is the longest prompt presented thus far. The researcher, Okubo, attempts to investigate the hazy term *ibashou*. The researcher uses pairings to widen the range of the

prompt. Examples include "scene or situation" and "state and situation." Okubo also lists additional PAC Analysis instructions within the prompt. With any lengthy prompt, it can be difficult for the participant to focus on a specific incident in his or her past. The answers may become superficial in an attempt to cover all points raised in the prompt. While not as problematic, a participant may focus deeply on a single component of the prompt. Consequently, it may become challenging to summarize data if each participant's focus is on a different portion of the prompt.

Example 10: *The Importance of Prelingual Affective Communication Some Implications from the Field by Kubota, M. (2008)*

In the final article surveyed, Kubota looks at "classroom teacher/student interaction by focusing on the communication between volunteers and children in a Non-Profit Organization" (2008). The research was conducted in English, but all participants had some degree of other language proficiency. Kubota chose PAC Analysis for its ability to give insight to "deep inner psychology which even the subjects have not realized about themselves and the situation" (2008). Something unique about Kubota's study was the use of both adults and children as participants. The adults were able to summarize their own data better and grasp the idea of a dendrogram. Children were more likely to be confused by the hierarchy and groupings in the diagram. The researcher had to make substitutions to PAC Analysis for children.

The stimulus prompt was

<u>English</u>
Did you get anything from working at TCC (a non-profit organization)? What was it? What kind of situations lead to whatever it is that you have gained? Please write one word or an image that comes to mind on a note card and write a number from 1."

This prompt listed three consecutive questions, but the first question was a polar question that allowed only a yes or no answer. In the recorded data, the researcher noted that some participants responded that they couldn't remember any specific incidents or items. The first question could interview with participants recall. A positive revision might ask participants to recall a specific beneficial episode and apply those characteristics to their larger interpretation of working at the NPO. The participant also included some procedural instructions of PAC Analysis. The final instruction to "write a number from 1" may have been slightly mistranslated but from the current state of the stimulus response participants may be unsure the purpose of the numbering.

Final Observations

The previous ten studies were varied and showed the comprehensive range of applications for PAC Analysis. PAC Analysis allows researchers, educators, psychologists, engineers and more to look at an individual's deep understanding of a particular topic.

This brief review of PAC Analysis from different disciplines was enriching. Reviewing a more extensive than usual range of research gives a deeper insight into what constitutes a better stimulus response and provides advice to avoid pitfalls when conducting PAC Analysis in future research. From a general overview, the following suggestions can be made when writing a stimulus prompt for PAC Analysis.

・Ask the participants to recall a specific event or events to better prepare the participant to provide rich data.
・Write a clear and concise question.
・Focus on an event with some difficulty or struggle
・Limit the number of questions within the stimulus prompt to prevent confusion.
・Refrain from using multiple synonyms to describe a single item or concept.
・Remove procedural instructions from the stimulus prompt.

While this is not a comprehensive list, it is beneficial for any researcher considering PAC Analysis to contemplate each suggestion.

Ultimately, the final decision to use PAC analysis rests with the researcher. Hopefully, with careful decision making and the matching of desired outcomes with methods, a researcher can choose PAC Analysis as their research method and craft the best stimulus prompt.

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