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Abstract

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Keywords

Mixed Methods Research, Collective Emotion, Assessment Tool, Validity, Gun Violence

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Emotions are now widely accepted as important elements of qualitative research, in studies of individuals and communities. However, collective emotional status—what a community feels about a given situation or proposition—can be challenging to assess. In this study, we examined the validity and acceptability of a new mixed methods survey tool, primarily qualitative, to address this challenge—the Assessment of Collective Emotional Status (ACES). The tool begins with an adjustable set of questions about emotion, to draw respondents' attention to their own feelings. These are followed by an emotional self-assessment, in which respondents select and prioritize five emotional responses to a standardized stimulus, drawing from a new taxonomy of emotion words. In this study, the stimulus was a proposition that gun violence should be approached as a public health problem. We tested the tool in an international survey of public health professionals, mostly in the US and Europe (n=160). Qualitative and quantitative data were collected on knowledge and importance of emotion, adequacy of the taxonomy, emotional responses to the stimulus, and use of the tool. Scores were high for knowledge and importance of emotion. Perceived adequacy of the taxonomy was also high, especially with Black and Hispanic respondents, signifying good construct validity. The total weighted frequency of emotions in response to the stimulus was highest for encouraged (92.2%), open (78.8%), hope (77.2%) and interest (77.2%). Qualitative data yielded six themes—on knowledge of emotion, the taxonomy, responses to the stimulus, and use of the tool, which many respondents found easy and interesting to use. This study demonstrates the prima facie validity and acceptability of the ACES with an educated adult population. Keywords: Mixed Methods Research, Collective Emotion, Assessment Tool, Validity, Gun Violence

Introduction

Emotions are important. They affect the way we think and behave and are now widely accepted as important data—in the qualitative study of individuals and communities—in fields as diverse as health science, education, economics, and neurobiology. However, assessing emotional status—what an individual or community "feels" about a given situation or proposition can be challenging. This is especially true for the assessment of "collective" emotional status (Bericat, 2016; Jarymowicz & Bartal, 2006; Kitayama & Markus, 1994; Von Schieve & Salmella, 2014).

The first challenge—and this applies to individual and collective emotion—is to determine what is, and what qualifies as, an emotion. We may agree that happiness, sadness, and anger are emotions, but what about anxiety, hope, curiosity, and despair? There is some consensus across disciplines on what emotion is—an appraisal of a stimulus and response to

it—but there is very little agreement on what qualifies as an emotion. For the purposes of assessment, we are challenged to establish standardized operational definitions.

The second challenge is how we as researchers are to recognize individual emotions since the experience of emotion is subjective. There is wide agreement that "emotion" signifies an objective physiological and psychological event, while "feeling" signifies the subjective experience of that event (Barrett, Mesquita, Ochsner, & Gross, 2007; Scherer, Shorr, & Johnstone, 2001), and there have been efforts to classify the facial characteristics and body language associated with some emotion events, but we have no comprehensive, evidence-based atlas of emotions and their physical appearances. So, researchers seeking to assess emotional status must rely on self-reporting. The problem here is that people do not always know what they feel! Some are more emotionally intelligent than others. When assessing emotional status, we are challenged to find ways to help interviewees identify what they feel.

The third challenge, which is especially important when assessing "collective" emotional status is how to generate data that are not only standardized in definition but can also be aggregated, for purposes of comparison. A simple frequency distribution for reported emotions is not enough, since individuals (and therefore communities) may have multiple feelings about a given situation or proposition. In creating comparable data on emotional status, we need to collect well-defined data and standardized procedures for data analysis.

This study examines the validity of a new tool to help resolve these three challenges—the Assessment of Collective Emotional Status (ACES). ACES was developed for use in our field of public health, where emotion is a well-established determinant of health and plays a role in many public health issues, for example (*emotion words in italics*), *anger* is implicated in the etiology of hypertension and heart disease (Chida & Steptoe, 2009; Diamond, 1982); *shame* is a major obstacle to the disclosure of HIV status, which is critical for controlling the spread of the disease (Skinta, Brandrett, Schenk, Wells, & Dilley, 2014); *frustration* is a well-established factors contributing to domestic violence (Garbarino, 2005); and *loneliness* is associated with multiple poor health outcomes (Luo, Hawkley, Waite, & Cacioppo, 2012). Likewise, happiness is associated with longevity (Steptoe, 2019), as is *curiosity* (Swan & Carmelli, 1996), while *gratitude* uniquely predicts lower levels of depression in arthritis (Sirois & Wood, 2017), and *hope* promotes social connectedness (Kok & Frederickson, 2010), which is good for the heart (Berkman & Syme, 1979; Kok et al., 2010. Psychological tests are available to determine the status of these and other "singular" emotions (see, e.g., Miller & Lovler, 2016), but we have no standardized tool that covers a comprehensive range of emotions.

Since emotion is a response to a stimulus, we needed to select a stimulus in order to examine the validity and acceptability of the ACES tool. We used a proposition that "gun violence should be treated as a public health issue." For two decades, gun violence has been a growing topic of concern in the public health literature (Frattaroli, Webster, & Wintemute, 2013; Hemenway, 2017; Hemenway & Miller, 2013; Koop & Lundberg, 1992), but research into the causes and prevention of gun violence (a public health approach) has never been a funding priority. Our primary goal was to field-test the tool, but the results also detail the emotional status of health professionals on gun violence being addressed as a public health issue.

Our personal interests in conducting this study were two-fold. One of us (MS) is a qualitative researcher with an interest in the role of emotion in social and environmental problems, and the design of interventions to address them. His publications include seminal reports of community participation in public health projects (Schwab, 1997; Schwab, et al., 1992; Schwab & Syme, 1997). The other one of us (VM) is a primarily quantitative researcher, with a special interest in the validity of data collection tools and in the conduction of mixed-methods studies. As practicing dentist for many years and then as public health faculty, he

published qualitative and quantitative studies on dental anxiety and validation of both survey and clinical instruments (Margaritis, Koletsi-Kounari, & Mamai-Homata, 2012; Margaritis, Mamai-Homata, & Koletsi-Kounari, 2011). Both of us serve as Chair for doctoral research students and have noted the difficulty that students have in collecting reliable data on emotion. In this study, we not only aimed to create a validated instrument for our students, but also to add to the literature on the value of mixed methods in resolving intractable challenges in social science research.

Methods

1. The Tool

ACES is a relatively simple mixed-methods emotional self-assessment tool in which we have tried to overcome the three challenges described above—to clarify what emotion is and what qualifies as an emotion, to facilitate respondents' capacity to identify what they feel, and to find a way to generate trustworthy and comparable.

First Challenge—Clarifying what emotion is and what qualifies as an emotion

Emotions and feelings have been the subject of vast research in multiple fields for over a century, and there are many theories and controversies relating to their nature and function (Weatherell, 2012, 2014). Still, there is broad agreement on some things: emotion is psycho-physical response to a stimulus; the stimulus may be any sensory experience—of a situation or a proposition or a place (Scherer et al., 2001); and this response comprises two major steps—"appraisal," in which sensations are recognized and interpreted, and a "tendency to action" or behavior (Arnold, 1960; Scherer et al., 2001; Scherer, 2009). We also know that emotions flow and change more-or-less continuously, in complex, layered patterns (Weatherell, 2012).

While there is consensus on the rough parameters of what emotion is, there is none on what qualifies as emotion. Anxiety, hope, curiosity, despair, joy, interest … there are lists of emotions in multiple languages, some containing hundreds of words. To contain the collection of data, and provide comparable results, we needed a discrete set of emotions from which participants could select. In addition, the list had to be organized in an accessible way—either alphabetically or classified according to a taxonomy that revealed similarities of meaning.

Previous attempts at emotion classification have been few, and most were limited to a small number of emotion words, notably the so-called "basic emotions," which are biologically inherited and form the basis of all other emotions. However, there has been little agreement on what the basic emotions are. Tomkins (1962) identified six basic emotions (in pairs, to denote the mild and more intense forms of the emotion): interest-excitement, enjoyment-joy, surprise-startle, anger-rage, and fear-terror. Others went on to propose other lists (e.g., Izard, 1969; Plutchik, 2001), with little consensus between them (Ortony & Turner, 1990). The debate continues, and today there is some agreement that four emotions—anger, fear, happiness, and sadness—may all be considered "basic" (e.g., Celeghin, Diano, Bagnis, Viola, & Tamietto, 2017; Ekman, 2007; Ekman & Cordaro, 2011; Jack, Garrod, & Schyns, 2014). However, there is no consensus on the relationship of the "basic emotions" to "non-basic" emotions, nor what those other emotions might be. Attempts at classification have used the pleasure/pain axis as an organizing principle (Lazarus, 1993), or arousal/sedation and dominance/submissiveness (Kuppens, Tuerlinck, Russell, & Barrett, 2013; Russell, 2003), but again, only a small number of emotions were included in these efforts.

Needing a comprehensive but discrete taxonomy of emotion words, one of us (MS) worked with a diverse panel of health professionals and graduate students to create a new

comprehensive taxonomy based on felt experience. The method used to develop the taxonomy combined two approaches commonly used in public health. The first was community-based participatory research, in which community members play an active role in directing the course of the research (Schwab & Syme, 1997; Israel et al., 2012). The second was heuristic phenomenology, which focuses on 'lived experience' as the object of inquiry (Moustakas, 1990). Initially, we conducted focus groups and interviews to develop a list of some 300 emotion words and organize them into opposites. Then, a group consensus procedure based on Shaver et al. (1987) was used to cluster the sixty-four paired emotions into eight opposing 'families,' each family containing eight feelings that represented shades or aspects of the family. The opposing family names were *attraction* versus *aversion, confidence* versus *fear, peace* versus *agitation,* and *joy* versus *grief.* These were, in a sense, our 'basic emotions', each containing eight 'non-basic' emotions. (See Figure 1).

Second Challenge—Facilitating respondents' capacity to identify what they feel

By presenting a discrete set of emotions organized into families, we hoped to make it easier for respondents to identify their responses. However, we added another strategy to the tool, by starting the questionnaire with a set of preliminary emotion-focused questions, to draw respondents' attention to the meaning and diversity of emotions. These questions elicited quantitative and qualitative data on knowledge of emotion, perceived importance of emotion, and perceived adequacy of the taxonomy.

Questions on Knowledge of Emotion. These questions asked to what extent (0-100) respondents agreed with five statements based on widely accepted characteristics of emotion. Four statements were true—"Emotions are physical and mental events," "Emotions are responses to stimuli," "Emotions are precursors of behavior," and "Emotions may be personal or collective"—and one statement was false, "Emotions serve no function; they are random events."

Questions on Importance of Emotion. These asked two quantitative questions—"How important are emotions as determinants of health and disease? (0-100)" and "How much are emotions acknowledged in your field of work? (0-100)"—each followed by an open-ended question to obtain qualitative verbal data, "Please explain."

Questions on Adequacy of the Taxonomy. Here, we asked respondents to review the taxonomy provided for the central emotional self-assessment portion of the tool, and answer a quantitative question—"To what extent is the taxonomy adequate for assessing emotional status (0-100)?"—followed by an open-ended qualitative question, "Please explain."

Demographic questions. We also collected quantitative demographic data on gender, ethnicity, profession, age, and country of residence, to enable us to investigate potential quantitative associations between these variables and scores on the preliminary questions.

Third Challenge—Generating trustworthy and comparable data.

While our strategies towards the first two challenges were intended to contribute to the validity and acceptability of the ACES tool, the principal site of validity was the emotional self-assessment in response to the stimulus. Since emotions are often layered, with more than one emotion being felt or expressed at the same time, the self-assessment questions asked participants to select and prioritize five feelings from the taxonomy in response to the stimulus.

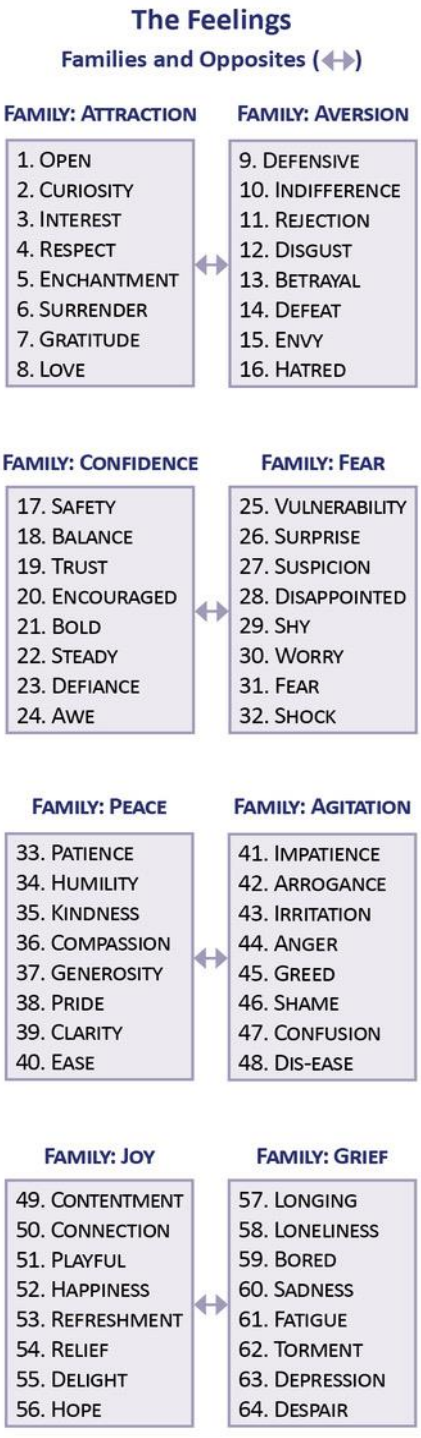

Figure 1. Taxonomy of Emotions for Self-assessment

For this study, the stimulus was a proposition that gun violence be regarded as a public health issue. In addition, respondents were asked to explain their selection and priorities in words. The quantitative results were weighted by selection choice to provide a frequency index for each emotion, while the qualitative data were analyzed for themes to explain the quantitative data (see also Data Analysis below).

2. Content and Face Validity of the Tool.

Prior to the survey, a panel of five public health experts—recruited from academia and a local health department—was convened to review the construct validity and face validity of the tool, including the new taxonomy. Construct validity was defined as the extent to which the tool covers all facets of the construct "emotional status"; face validity was the extent to which the tool is subjectively viewed by participants as covering the concept of "emotional status." Four rounds of feedback and discussion enabled us to refine and re-organize the wording of the questions and reduce their number. In the survey itself, construct and face validity were evaluated and confirmed through questions on perceived adequacy of the taxonomy, and participant's experience of completing the tool.

3. Sample, Recruitment & Data Collection

Once the University IRB had given its approval, we posted the survey tool on Survey Gizmo, with a Consent Form, and recruited participants through social media, public-access faculty lists, and University research bulletin boards in the US and Europe over a two-month period. In this way, a purposeful sample of 160 health professionals completed the survey online. They included individuals in academia (24%), health administration (17%), public health practice (27%) and clinical practice (26%). Most (78%) lived in the US or Canada; the balance lived in other countries, mostly in Europe. Work location was Urban 61%, Suburban 17.5%, Rural 10%, and Virtual 11%. Two thirds (67.5%) were women, and the average age was 47 years (SD=11.3 years). Self-identified ethnicity was White 57%, African American 7.5%, Asian/Pacific Islander 4%, Hispanic/Latino 2.5%, with 30% No response. Most had a university degree (Doctorate 31%, Masters 30%, Bachelors only 7.5%).

4. Data Analysis

Preliminary Questions

We analyzed the quantitative data using descriptive statistics for all demographic variables and preliminary question scores, and inferential analysis to explore potential associations between them. Since the quantitative data were not normally distributed, non-parametric inferential tests were applied. Probability values (*p*-values) were compared to a significance level of 5%. The qualitative data—from the preliminary questions, and the final question on experience of the assessment—we hand-coded by research question, to identify and define common phrases or concepts, then clustered the codes into 17 possible or emergent themes, as recommended by Patton (2015). These themes corresponded to the content of the survey questions. Finally, we aggregated the emergent themes into 5 final themes, all but one (theme 1) with several sub-themes.

Emotional Self-Assessment

We analyzed the quantitative data in a two-step process. First, we calculated the "percentage frequency by selection order" for each emotion in each place in the selection order (SO1-SO5). Then we calculated the "total weighted percentage frequency" of each emotion was calculated using the formula (SO1 x 5) + (SO2 x 4) + (S03 x 3) + (SO4 x 2) + (SO5 x 1). Our method for analyzing the qualitative data was the same as for the preliminary questions.

Results

The results are reported by the main categories of the interview questions, i.e., knowledge of emotion, importance of emotion, adequacy of the taxonomy, self- assessment of emotional status on the proposition, and lastly, experience of using the tool.

Knowledge of Emotion: Theme 1. Most respondents had good basic knowledge of the characteristics of emotion

Quantitative Data. Respondents' knowledge of emotion was assessed on the basis of their agreement with five statements: four of them true (S1-3 and S5), and one false (S4). As shown in Table 1, there was a high level of agreement with each of the true statements (73.6–81.4%), and a low level of agreement with the false statement (12.7%), indicating a relatively high level of knowledge, and a high level of homogeneity in the sample for all statements except one—the false statement that emotions are random events, serving no function. Europe-based respondents were significantly more likely to agree with this false statement (31.3% versus 7.8% among US respondents, and 14.3% for those elsewhere) suggesting a more evolved understanding of emotion in the US! There was also significantly less agreement with the true statement S5 (emotions may be personal or collective) among older respondents, suggesting a generational shift towards greater acceptance of collective emotion among younger participants. There were no significant differences by profession or ethnicity.

Table 1. Knowledge of Emotion

Statement	Mean Score (%)	Standard Deviation
S1. Emotions are physical and mental	73.64	06.15
S2. Emotions are responses to stimuli	74.37	22.61
S3. Emotions are precursors of behavior	72.93	22.74
S4. Emotions are random, serve no function	12.71	20.00
S5. Emotions may be personal or collective	81.38	23.50

Importance of Emotion: Theme 2. Emotions are considered important determinants of health, but this is not always recognized in practice.

Quantitative Data. The mean score for the importance of emotions in health and disease was 80.1% (SD, 15.60), showing widespread agreement that emotions are considered to be important determinants of health. However, when asked how much emotions are acknowledged in their field of work, participants responses gave a significantly less mean score, 63.0% (SD, 29.55). These results show that health professionals, not surprisingly, experience emotions as playing an important role in health, but that the idea of emotion as a determinant of health, is not yet so widely established in our profession. Additional research with large populations will likely be needed to change this.

Qualitative Data. The qualitative data supported the first quantitative result that emotion is an important determinant of health, but not the second, about the recognition of emotion in daily practice. It may be that a specific question on that would have been needed.

Sub-theme 2a. Emotions are commonly experienced in practice, but not so often recognized in research. We received multiple examples of emotion affecting health. Several

doctors, nurses and others involved in direct patient care reported how patients' emotional attitude can affect healing. For example, a dialysis nurse commented, "I have noticed that patients with a more positive outlook on their condition seem to do better with their dialysis and are often more likely to get transplants due to overall health." Another provider, in the field of HIV for ten years, wrote: "I have noticed how emotions contribute to the patient's wellbeing. Emotions determine level of disclosure, stigma, denial, and much more." A third participant, a psychologist, wrote, "I provide psychotherapy in a primary care setting and assist physicians in recognizing emotional factors that contribute to patients' illnesses, and their lack of adherence to recommended treatment." Though most participants gave an example of how they personally recognize the importance of emotion in their work, many also reported that emotions are not explicitly addressed in their practice. As one health educator reported, "If we practiced what we believe, emotion would be a more prominent variable in public health research."

Sub-theme 2b. Anger and sadness, anxiety and despair are often seen. When asked which emotions they most commonly encountered in practice, anger and sadness were very commonly cited. For example, a nutritionist wrote "Both a*nger* and *sadness* impact eating habits. Eating to help move through these emotions leads to overeating and weight gain." A nurse reported, "I find that patients with a positive attitude respond to treatment better, and those with *anger/sadness* struggle more with treatments." Another commented that many of her clients are weighed down with multiple emotional problems, for example, "Feelings of *helplessness, anxiety, depression and worthlessness* are determinants in everyone's health but particularly for the poor, disabled, elderly, minorities, those with language barriers, and those with questionable immigration status." These findings confirm yet again the literature showing strong associations between emotions, health-related behaviors, and health outcomes.

Sub-theme 2c. Many responses reflected a bio-psycho-social model of health. Public health problems are increasingly recognized as multi-factorial, i.e., resulting from multiple, interconnected, physical, mental factors, both social and environmental. Many responses recognized this complexity, for example, "We are moving towards a bio-psycho-social model, which is holistic in approach, taking into account factors such as emotional, educational, cultural and economic status." Another participant commented, "The physical environment, genetics, behavior etc. all impact a person's overall health." Some respondents were more specific to the body-mind connection, for example, "Emotions influence everything in one's physical health (hormones, neurotransmitters, blood pressure, heart rate, etc.)." These responses reflect a growing acknowledgment in public health that a multi-tiered approach to risk factors is needed when resolving complex problems, and that emotion is an element of this.

Sub-theme 2d. The practitioner-patient relationship rests on emotion. A small number of participants focused on emotions that contribute to the success of medical treatment. One respondent wrote, "… tenderness, sympathy, hopeful, confident, trust, also indifferent and frustrated, are some emotions which may occur between practitioner and patient." This is consistent with the literature on the role of trust and hope in the provider-patient relationship, and the role of these emotions in effective care and successful healing.

Adequacy of Taxonomy: Theme 3. The taxonomy was well received but also critiqued.

Quantitative Data. The construct validity of the taxonomy was assessed by asking the extent to which the taxonomy is adequate for assessing emotional status. The mean score was 73% (SD 21%), suggesting a relatively high level of adequacy. Bivariate analysis showed that persons with a master's degree or doctorate were significantly more likely to score higher than

those with a bachelor's degree (Table 2), suggesting a possible association between higher education and appreciation of emotion, or between higher education and the ability to understand a taxonomy. There was also a significant association between ethnicity and scores for adequacy of the taxonomy: as shown by bivariate analysis (Table 3), "minority" professionals—of African, Hispanic or Asian ethnicity—rated the taxonomy higher than White or Anglo respondents, perhaps suggesting that emotional intelligence differs by ethnicity. However, any such possible associations are part of complex patterns involving culture, education, and other factors, and therefore difficult to interpret. There were no other significant associations between demographic variables and adequacy scores.

Table 2. Adequacy of Taxonomy by Education

Highest Degree		Adequacy of taxonomy score (0-100)
Bachelor	Mean	60.83[1,2]
	N	12
	Std. Deviation	18.145
Master	Mean	76.96[1]
	N	48
	Std. Deviation	23.312
Doctorate	Mean	73.60[2]
	N	48
	Std. Deviation	19.453
Total	Mean	73.60
	N	120
	Std. Deviation	20.917
Kruskal Wallis, post hoc Mann-Whitney U, $p<0.05$ (statistically significant) between values with same superscripts.		

Table 3. Adequacy of Self-Assessment Taxonomy by Ethnicity

Ethnicity		Adequacy of taxonomy score (0-100)
White	Mean	72.26
	N	91
	Std. Deviation	21.075
Black	Mean	81.00[1]
	N	12
	Std. Deviation	17.341
Hispanic	Mean	88.75[2]
	N	4
	Std. Deviation	10.308
Asian/Pacific	Mean	88.67[3]
	N	6
	Std. Deviation	11.690
Other	Mean	58.43[1,2,3]
	N	7
	Std. Deviation	28.832
Total	Mean	73.60
	N	120
	Std. Deviation	20.917
Kruskal Wallis, post hoc Mann-Whitney U, $p<0.05$ (statistically significant) between values with same superscripts.		

Qualitative Data. The qualitative data not only supported the broad acceptance of the taxonomy but provided valuable feedback on ways that the taxonomy might be improved.

Sub-theme 3a. Most responses were positive, and some were highly enthusiastic. One respondent stated: "This list covers many more emotions that I have ever considered;" another wrote, "I've not seen a better way of showing how emotions are related to each other;" while a third reported "I found the classification very interesting and easy to understand." These responses are aligned with those on participants' experience of using the tool (see theme 5). At the same time, several respondents also provided critical comments and suggestions, and these are presented below.

Sub-theme 3b. Some offered a critique of classification by opposites and families. The taxonomy was designed to present a wide range of emotions in an accessible way, by family and by opposites. The primary opposition we adopted was the embedded in the pleasure/pain axis, which is a common aspect of previous attempts to classify emotions. Some participants embraced the idea of opposites, for example, "The idea of emotions having their opposites was intriguing." Others pointed to limitations, for example, "Not all feelings have a polar opposite" and "I am not sure if one is necessary the opposite of another." Some were more specific about emotions that cannot easily be assigned to pain or pleasure, for example, "Feeling *humble* or *defiant* is not necessarily pleasant," and "*Surprise* is not always a painful feeling." This critique reminds us that the taxonomy is a work in progress, but the construct validity of the tool is nevertheless moderately good.

Sub-theme 3c. This taxonomy may be culture-specific. Several respondents pointed out that emotions are expressed and understood in different ways in different cultures, for example, "Emotions differ in different cultures and that should be taken into account." "Not sure it comprises all feelings, especially if one thinks about the impact of culture." This is an important reservation that is supported by the literature; culture and other social conditions are critical in how we identify, interpret and express emotions (Kitayama & Markus, 1994; Peterson, 2007). Our taxonomy was developed by a relatively homogenous panel of Americans, and tested with a sample which, though international, was primarily composed of educated health professionals. The ACES tool, including the taxonomy, may need to be adapted for use in other cultures.

Emotional Status on the Proposition (Gun Violence as a Public Health Issue): Theme 4. Most felt open and encouraged at the proposition, some had reservations.

Quantitative data. The percentage frequency of respondents' five main feelings about a public health approach to gun violence, presented by selection order, are shown in Table 4, along with the total weighted percentage frequency for each emotion. The emotion with the highest total weighted percentage frequency was e*ncouraged* (92%), followed by *open* (79%), *hope* (77%) and *interest* (77%), suggesting widespread acceptance of the proposition. *Anger* also scored high (72%). We re-analyzed these data after qualitative data (below) had shown that most anger was at the gun violence itself or the government for not preventing it. Anger at gun violence or the government was very common (72%) compared with anger at the proposition that gun violence be treated as a public health issue (15%). In addition to anger, a significant proportion (55%) were worried, reflecting the controversial nature of gun ownership in the US.

Table 4. Percentage Frequency of Emotions on Gun Violence (GV) as a Public Health Issue, by Selection Order and by Weighted Total Percentage Frequency

Individual Emotions	**Percentage Frequency by Selection Order (SO)**					**Total Weighted Percentage Frequency**
	1st (S01)	**2nd (S02)**	**3rd (S03)**	**4th (S04)**	**5th (S05)**	
Encouraged	10.6	5.6	3.1	2.5	2.5	**92.2**
Open	10.6	1.9	3.1	2.5	1.3	**78.7**
Hope	1.9	6.3	5.6	9.4	6.9	**77.2**
Interest	3.8	4.4	5.6	5.0	3.8	**77.2**
Angry at GV or at government*	3.6	9.6	1.9	3.8	1.9	**71.6**
Worry	3.1	3.8	4.4	3.8	3.1	**54.6**
Curious	3.1	5.0	3.8	1.3	0.0	**49.5**
Vulnerable	1.3	3.8	1.3.	3.1	2.5	**34.2**
Sad	1.9	0.6	3.1	3.1	3.8	**31.2**
Despair	0.0	4.4	1.3	1.3	1.3	**25.4**
Angry at GV as a PH issue*	3.0	-	-	-	-	**15.0**

*This distinction between forms of anger is based on qualitative data

Qualitative Data. Again, the qualitative data clarified the quantitative data with details of how participants felt about the proposition.

Sub-theme 4a. There was widespread emotional agreement with the proposition. There was wide agreement that a public health approach to gun violence, through research and evidence-based policy, would open the way for a more scientific approach to gun violence and new evidence-based solutions. For example, one participant wrote, "Since so little research has been done on gun violence and firearms in general, we have the opportunity to make a difference regarding gun violence using evidence, science and common sense." Some respondents pointed out how communities would be better informed and offered the opportunity to participate, for example, "Addressing gun violence as a public health issue would encourage people in the community to have open and productive conversations on how to reduce gun violence deaths." This was taken up by another participant with an emotion-rich comment: "I like the idea to collectively fight against gun violence, and I would be *open* and *interested* in contributing to it. Such an attempt would make me feel *encouraged* and *hopeful*!" Several respondents went further, offering public health models that might be effective; for example, on respondent wrote, "Gun violence prevention could parallel tobacco; both are multi-factorial and require multi-level interventions—personal (mental health), social (gun culture), political (advocacy for and against regulation)." Since this kind of multi-layered approach is now common for public health research and interventions, it would likely be applied to gun violence were it declared to be a public health problem.

Sub-theme 4b. Many felt angry about gun violence and government inaction; a few felt angry at the proposition. Three kinds of anger were described in the qualitative data. First, there was anger at the gun violence itself, for example, this comment from a nurse: "When I think about gun violence, I experience a wave of emotions and my first thought is always with kids who are needlessly shot and killed, especially in schools." Or this: "I think that gun violence is a huge problem. Right now, there is a battle to make gun ownership illegal. It makes

me angry that people are more concerned with their rights than people's lives." A second kind of anger was directed at "the Government," for example, "Angry because of the increased gun violence in our country and our government not doing anything about it!" And this: "It makes me irritated that congress is so divided and will not address this issue fairly." A third kind of anger, expressed by a small number of respondents, was directed at the idea of gun violence becoming a PH issue (which was the actual proposition), for example, "I feel angry because people are blaming guns, not the people using them, and I feel defiant, because we have the right to bear arms." We thought that the proposition was clearly stated in the survey questionnaire, but many responses reflected a conflation of emotions that referred beyond the proposition. These results demonstrate how carefully questions about emotion must be posed. The quantitative data presented a prima facie significant anger response to the stimulus, but in many cases, this turned out to be a response to a different question.

5. Experience of Using the Tool: Theme 5. The tool is interesting and easy to complete, showing good face validity

Qualitative Data

Sub-theme 5a. ACES is an interesting tool with research potential. There were many comments on how the self-assessment had been an easy and interesting experience. Indeed, the most common word used to describe the self-assessment was "interesting" for example, one respondent wrote, "It was interesting to check my emotional responses. I was surprised at my optimistic view." Another stated, "It's an interesting idea to ask people to assess their emotions related to health issues. This is a great tool." Many volunteered that the ACES has research potential. One participant noted, "It is a very good tool on which to base a lot of research." Another commented, "An excellent research tool for scholars to collect data!" A third explained that "bringing this tool into public health could allow for more research and more emotionally-sensitive programs (to prevent disease and promote health)." These data support the case for further development of the tool.

Sub-theme 5b. For some, the self-assessment is complex and requires time. A small number of respondents reported that the taxonomy is too complicated. "It's complex and confusing," wrote one. "There are too many things to think about," wrote another. A third reported "It's very comprehensive, but a lot to look at, could it be simpler? Too many options to choose from!" A list of sixty-four emotions, even when clustered into families of similarity, was clearly too much for some. In addition to over-complexity, a few respondents volunteered that the ACES is time-consuming, for example, the comment from a health educator that "It seems to be an interesting system. However, my feeling is that we do not give the responses we might have given because of the limited time we usually devote to similar questionnaires." Time and complexity are factors in face validity—the extent to which the tool is subjectively viewed by participants as covering the concept of "emotional status." The data represented by sub-themes 5(a) and (5(b) suggest to us that we are on the right path with this tool, but that face validity can probably be improved.

Sub-theme 5c. The taxonomy requires reflection but may facilitate awareness. Not everyone knows what they feel, and one of our challenges with this tool was to facilitate the process of self-assessment. Several respondents drew attention this challenge. One wrote, "It's a good system, but it can be hard to differentiate between how one FEELS about something versus how one THINKS about something." Another thought that some form of preparation might be required, "This might work as long as the users are adequately trained." Clearly, for

some individuals, providing a set of preliminary questions to draw attention to emotion, and a list of emotions from which to select a response to the stimulus, is not sufficient. By contrast, some participants reported that that the tool facilitated their awareness of emotion, helping them go beyond thinking to their felt experience. One wrote, "The framework is good to identify the range of emotions to help give some consciousness to the quality of a feeling." Another participant reported that the tool "gives me options to identify what I'm feeling, and this helps me think more clearly about a problem." Yet another responded, "This system really made me think about exactly how I felt rather than just use general language." These comments suggest that the ACES tool could be useful not only for assessment, but also for emotion education. The taxonomy alone can provide a useful resource for researchers wishing to expand and refine their emotional vocabulary.

Discussion

Social science researchers wishing to collect data on emotion through interviews or surveys have to face three challenges: (1) to establish what qualifies as an emotion, (2) to facilitate respondents' ability to identify what they feel, and (3) to generate data that can be systematically aggregated and compared. This third challenge is especially important in the assessment of collective emotional status. The ACES tool addresses all these challenges with moderate success.

Establishing what qualifies as an emotion

Before beginning this study, one of us (MS) worked with a panel of health professionals to develop a taxonomy of emotion words from which participants could select their priority responses. This taxonomy served as a basis for the emotion self-assessment.

Adequacy of the Taxonomy (construct validity)

The mean score for the adequacy of the taxonomy was 73%, confirming construct validity. People of color (African, Hispanic and Asian Americans) were most likely to find the taxonomy acceptable, followed by those with a higher degree. However, some participants drew attention to inconsistencies in the taxonomy—mostly relating to the organization of emotions into families and opposites. This was not surprising because, though the clustering of similar emotions is not new in the literature, attempts to populate each cluster or family in a systematic way have been very few (e.g., Plutchik, 2001; Shaver et al., 1987), and there is clearly room for further exploration. The ACES taxonomy, presented as a binary system of opposites, can probably be improved.

Helping participants to identify what they feel

Aside from the taxonomy, our strategy here was to introduce a set of emotion-related questions before the central emotional self-assessment question, to encourage participants to think more deeply about emotions—what they are, how they affect behavior, and how they are related to each other. Sadly, we did not specifically evaluate this strategy (a limitation of the study), but—judging from our data on the adequacy of the taxonomy, and some of the responses to the preliminary questions, we conclude that these two elements of the tool may have been instrumental in helping respondents articulate what they felt. Several participants stated that the preliminary questions helped them focus more clearly on what they felt, and that the taxonomy could be used for education as well as assessment. Since the preliminary

questions can be adapted to fit the survey population and the nature of the topic, other researchers in other settings may be better able to determine if they are a helpful part of the tool.

In this study, the preliminary questions also yielded some helpful ancillary data. For example, the question on knowledge of emotion enabled us to establish the homogeneity of the sample. Here, the finding that European health professionals are more likely to mistakenly believe that emotions are random events was surprising and merits further investigation. The data on the importance of emotion also yielded an interesting unexpected result—a difference between perceived importance of emotion and acknowledgment of emotion in public health practice, an indicator that training and practice may be lagging behind professional experience.

Experience of Using the Tool (Face Validity)

Completing the survey was described by a large majority as "interesting" and "easy." Many referred to the research potential of the tool, and a few volunteered that asking about emotion goes beyond cognitive survey questions like "to what extent do you agree" or "how much do you like." Some respondents found the taxonomy to be too complex, or inconsistent or incomplete, and others pointed out that the process takes reflection, time and emotional intelligence to complete, but these were outliers compared with the high degree of acceptance of the tool.

Generating data that can be systematically aggregated and compared

The ACES tool is designed to be used for small-scale qualitative research, administered as part of face-to-face interviews, or in larger-scale population surveys, to yield systematized data that can be aggregated and compared. Our strategy here was to use mixed methods, in the preliminary questions—yielding helpful ancillary data, as noted above—and in the emotional self-assessment question, where respondents are asked to select and prioritize five feelings in response to the given proposition (quantitative data), and then explain their choices (qualitative data). Quantitative analysis was used to determine the frequency of each emotion selected by selection order, weight these frequencies by selection order, and construct an aggregated score for each emotion. Qualitative open-ended data yielded helpful explanations. This proved to be an effective way to establish collective emotional status.

Emotional Status on Gun Violence

The self-assessment on gun violence as a public health issue yielded rich data on how health professionals feel about taking a public health approach to gun violence. The results, weighted by selection order, were highest for "open," "interested," "encouraged," and "hopeful," though some respondents offered reservations— for example, that the focus should be on mental health rather than a full range of potential contributing factors. However, "anger" also scored high, which seemed to contradict the findings of "open" and "encouraged." The qualitative data helped us understand this: most of respondents' anger was either in response to the high prevalence of gun violence, or in response to perceived government inaction to address gun violence; very few respondents were angry at the prospect of gun violence being regarded as a public health issue. Worry and curiosity also scored relatively high and here again the qualitative data provided an explanation; the application of epidemiological methods to gun violence is hotly contested, especially in the US, where the right to bear arms is cherished on a wide scale. Many respondents were "worried" at the challenges that may arise, and "curious" as to how it might unfold.

Final Lessons and Conclusions

Mixed methods was a good approach for this project, and qualitative researchers need only to add simple quantitative methods to their toolkit in order to use the ACES tool. In our study, the quantitative data gave us important collective information, and the qualitative data helped us interpret them. This is how mixed methods are supposed to work. However, we learned some important lessons, primarily in the collection and analysis of the qualitative data. One was the need for the stimulus to be stated very clearly. We could have explained what we understood by a "public health issue," for example, by using the phrase "taking a science-based public health approach." We might also have emphasized that the stimulus—to address gun violence as a public health issue—was not gun violence itself, nor the government's response to gun violence; as a result, many respondents reported their feelings towards the violence itself, or the government's response. Another lesson was the need to address weaknesses in the taxonomy, not the least being its cultural appropriateness. The preliminary questions can easily be adapted to multiple settings, topics, and populations, but the taxonomy should be reviewed and tested when working with other populations. These are important details, but they do not detract from our conclusion that this study establishes the prima facie construct and face validity of the ACES tool, and that others should explore its use in assessing the emotional status of other communities on other issues.

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