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2015-05-26

http://hdl.handle.net/20.500.11777/1034

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Article

Youth & Society
2016, Vol. 48(1) 126–143
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DOI: 10.1177/0044118X13483775
yas.sagepub.com

Developing a Valid Version of an Inventory to Measure Anger in Mexican Adolescents of Middle School Level: The ML-STAXI-MS

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Abstract

The goals were to develop a valid version of the Multicultural Latin American Inventory of Anger Expression and Hostility (ML-STAXI) for middle school Mexican youth (ML-STAXI-MS) and to test a new Questionnaire about Anger Expression with Physical Aggression (QAEPA). Five hundred and four adolescents (258 males, 246 females); (M_{age} = 13.75, *SD* = 1.01) from a public school in Mexico City completed both instruments. Exploratory factor analysis yielded seven factors for the ML-STAXI-MS. Four were identical (desire to express anger physically and verbally, angry feelings, temperament, and reaction) to those obtained in other Mexican samples, and three factors (anger-out and anger control-in and -out) were similar to other studies with the ML-STAXI. No anger-in factor was found. Alpha reliabilities ranged from .75 to .91. The QAEPA yielded a 4-item factor (α = .72) of physical aggressive anger expression (e.g., hitting).

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Keywords
adolescence, aggression, anger, measurement, validity.

Introduction

Anger is considered one of the primary emotions (Averill, 1983; Plutchik, 1980) and is experienced frequently across the lifespan (Tangney et al., 1996), including adolescence. In fact, some research suggests that adolescents experience anger more frequently than adults (Blanchard-Fields & Coats, 2008). Anger in youth is also related to personally and socially important issues such as aggression (Campano & Munakata, 2004), suicidal ideation (Lee, Choi, Kim, Park, & Shin, 2009), deliberate self-harm requiring medical attention (Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999), depression, hopelessness, alcohol problems, and drug use (Cautin, Overholser, & Goetz, 2001), and lower self-esteem, optimism, and family support (Puskar, Ren, Bernardo, Haley, & Stark, 2008). How anger is expressed and controlled is also very important. For example, difficulties in managing or controlling anger and angry ruminations are associated with aggressive behavior and physical damage to the angry person, others around him/her, and the physical environment (Loeber & Hay, 1997; Peled & Moretti, 2007; Santisteban & Alvarado, 2009). Anger and anger expression may be related to mental health issues such as those noted above, but may also need therapeutic interventions themselves. For example, Mexican parents of children aged 4 to 16 reported that 17.4% were irritable and 10.9% were explosive, and irritability was associated with perceived need for professional assistance (Caraveo-Anduaga, Colmenares-Bermúdez, & Martinez-Velez, 2002).

If researches are going to understand how anger and anger expression relate to important psychological processes in early adolescents, they need validated measures that are linguistically, culturally, and developmentally appropriate to this population. Despite efforts to develop and validate anger and anger expression scales in Mexican adults (Alcázar, Deffenbacher, & Byrne, 2011; Moral de la Rubia, González Ramírez, & Landero Hernández, 2010; Oliva Mendoza, Hernández Pozo, & Calleja Bello, 2010), and late adolescents (Alcázar, Deffenbacher, Pool Cibrián, Reyes Pérez, & Hernández-Guzmán, 2012; Vázquez Casals, 1994), authors could not find any validated measures for early adolescent (middle school) Mexican youth.

We chose the Multicultural Latin American Inventory of Anger Expression and Hostility (ML-STAXI) (Moscoso, 2000; Moscoso & Spielberger, 1999) as the starting point for the present research because it seems closer to Spanish as it is spoken in Mexico. With the ML-STAXI we developed a valid version of an inventory to measure anger in Mexican youth: the

ML-STAXI-MS. We added the letters MS referring to the middle school level. We need a valid anger inventory in Mexico because of (a) theoretical, (b) linguistic, and (c) clinical reasons.

First, although the ML-STAXI was constructed with participants from Latin American countries (Moscoso, 2000; Moscoso & Spielberger, 1999), with similar factor structures for Mexican adults (Alcázar et al., 2011) and older adolescents (high school students) (Alcázar et al., 2012), it cannot be assumed that the factor structure is the same with a Mexican middle school youth-only sample. Rather, we need empirical evidence to assess if the factor structure replicates. If so, the revised ML-STAXI-MS inventory might help to better understand anger in Mexican youth, because the inventory is based on the state-trait model (Moscoso & Spielberger, 1999; Spielberger, 1988, 1999).

The state-trait model considers that anger has two facets—experience and expression. Briefly, the experience refers to feeling the emotion in a situational or momentary form (state anger), and to the tendency to experience anger generally, in a chronic form (trait anger). The expression includes showing to other individuals that one is angry (anger-out), harboring grudges or keeping in the mind what provoked the anger (anger-in), controlling the own behavior when one is angry (control-out), and relaxing to reduce the emotion (control-in). The state-trait model is widely used to assess anger (Kerr & Schneider, 2008) and it has been validated producing similar factor structures across countries (Del Barrio, Spielberger, & Aluja, 2005; Kassinove, Sukhodolsky, Eckhardt, & Tsytsarev, 1997; Maxwell, Sukhodolsky, & Sit, 2009; Spielberger, 1988) and across Mexican samples (Alcázar et al., 2011, 2012; Moral de la Rubia et al., 2010; Oliva Mendoza et al., 2010; Vázquez Casals, 1994). As a theoretical need, this research will address if the state-trait model is valid in a Mexican middle school youth sample, not previously studied, supporting (or not) cross-national validity of the state-trait model and generalization of the factor structure across ages in Mexican samples.

Second, these are the linguistic reasons to have a valid anger inventory for Mexican youth. Although we found one instrument designed to assess anger in Hispanic early adolescents (Del Barrio et al., 2005), it was developed with youth in Spain who are linguistically and culturally different from Mexican youth. For instance, phrases like *estoy cabreado, estoy quemado, decir tacos*, and *rehúyo encararme* are related to anger in Spain, but they are not of common use in Mexico (Oliva Mendoza & Calleja Bello, 2010). Another issue is that Mexican participants frequently ask the meaning of *cólera*, a word which appears in an inventory to measure anger in Latin American countries (Alcázar et al., 2011; Moscoso, 2000). Therefore, even when some countries share Spanish as a common language, the linguistic equivalence cannot be assumed.

It is very likely that each country has its own rules, culture, words, meanings, and expressions with regard to anger. As a consequence, the validation of tests should assess empirically if items are appropriate for a specific country or region. This study will adapt the items of the ML-STAXI to a Mexican (middle school) youth sample because Mexican youth, just like youth from other countries, are unique in terms of their linguistic and cultural backgrounds.

Third, we need a valid anger inventory for clinical reasons. Research suggests that anger and aggression problems exist in Mexican youth (Muñoz-Abundez, 2008; Rivera-Rivera, Allen, Rodríguez-Ortega, Chávez-Ayala, & Lazcano-Ponce, 2006). Mexican parents report irritability, physical aggression, and explosiveness in their children to the extent of needing professional assistance (Caraveo-Anduaga et al., 2002). A valid anger inventory could help to survey anger-related mental health needs of youth, explore anger and anger expression variables as risk and protective factors, and serve as screening and outcome measure for intervention efforts.

Sometimes people express anger through physically aggressive means (Campano & Munakata, 2004; Wilkowski & Robinson, 2010). For instance, a national survey with Mexican adolescents shows that 14% of middle school students have received physical aggressions from their peers and 19% have engaged in physical aggression toward others (Muñoz-Abundez, 2008). Moreover, 15% of youth involved in dating relationships have experienced physical aggression from the partner (Mexican Institute of Youth, 2008) through pushing or hitting (Rivera-Rivera et al., 2006). However, we did not find validated instruments to measure angry physical aggression in Mexican youth. Some items of the ML-STAXI measure the desire to express anger physically, but only the desires at the moment of answering the questionnaire, not the general tendency to express anger through physically aggressive means. This study, therefore, added items to assess this important but overlooked dimension.

Hence, the goals of the present research were to develop a measure of anger and anger expression in Mexican middle school youth starting with the ML-STAXI item pool, and to add items about physically aggressive anger expression.

Method

Participants

The public school sampled is located in a *delegación* called Iztacalco, Mexico City. The city is divided into 16 *delegaciones* (boroughs) which are, in turn, divided into *colonias* (neighborhoods). According to the Mexican Institute of

Studies about Insecurity known as *ICESI* (2003), Iztacalco has security problems and is 9th among 16 boroughs in criminal incidence rates.

The sample consisted of 504 (258 male, 246 female) students (M_{age} = 13.75, *SD* = 1.01, range = 12 to16), of which 168 were in the 1st year, 184 in the 2nd year, and 152 in the 3rd year of middle school. Religious affiliation was 75.4% catholic, 10.7% other, and 13.9% did not have religious preference. Students from Mexican public schools do not pay for their studies and are usually from the lower and middle classes.

Instruments

Multicultural Latin American Inventory of Anger Expression and Hostility (ML-STAXI). The 44-item ML-STAXI (Moscoso, 2000; Moscoso & Spielberger, 1999) has eight factors or scales. Items are rated on 4-point scales (*1= almost never, 4= almost always*) with regard to how often the person feels or does the content of the item. Higher scores reflect more of the emotional or expressive characteristic assessed.

The 10-item State Anger Scale measures what the person feels and desires to do at the moment and includes a 6-item Feeling-Anger Scale (e.g., feeling angry or furious) that assesses current angry feelings, and a 4-item Feeling-Like-Expressing-Anger Scale which measures the person's desires to express anger physically (e.g., feeling like hitting someone or breaking things). The 10-item Trait Anger Scale measures the general propensity to experience anger across time and situations and includes a 5-item factor referring to be angry generally or angry-temperament (e.g., "I have an angry mood"), and a 5-item scale to assess anger in reaction (angry-reaction) to specific frustrating situations (e.g., "I get mad when someone screws up my plans").

The 24-item Anger Expression portion of the ML-STAXI contains four, 6-item scales to assess how anger is expressed: (a) Anger-in or suppressing anger and harboring grudges (e.g., "I boil on the inside but I do not show it"); (b) Anger-out or the outward, generally negative expression of anger toward others (e.g., arguing); (c) Anger-control-in or the person's attempts to maintain emotional control (e.g., trying to relax); and (d) Anger-control-out or instrumental efforts to manage one's behavior when angry (e.g., being patient with others). For the original ML-STAXI (Moscoso, 2000), alpha reliabilities ranged from .61 to .99 and scales formed small to moderate correlations with other measures of anger and anger expression, except for the higher correlations with factors in the same scale.

In Mexican adults (Alcázar et al., 2011) and late (high school) adolescents (Alcázar et al., 2012) the ML-STAXI has alpha reliabilities between .63 and .88, and adequate correlations between scales and with aggression measures,

and these correlations are similar to those of the ML-STAXI in Latin American samples (Moscoso, 2000).

Questionnaire of Anger Expression with Physical Aggression (QAEPA). The QAEPA was constructed because the ML-STAXI does not include a measure of physically aggressive anger expression. The QAEPA contained seven items about physical anger expression: (a) hit objects (wall, table, etc.), (b) hit someone, (c) do something to hurt your own body (e.g., cutting or biting oneself), (d) push someone, (e) throw things at someone, (f) damage or break your own things, and (g) damage or break things from others. The items (a) to (e) were generated in a previous study (Alcázar et al., 2011). In that study, one of the items was about breaking things, but it did not specify whether the own things or from others. Based on this item we generated two new, more specific items, the (f) and (g). We used items from a previous study because they had small to moderate correlations with the ML-STAXI, suggesting the items capture aggressive forms of anger expression which the ML-STAXI does not. Students rated items on a 1to 4 scale (*1 = almost never, 2 = sometimes, 3 = frequently*, and *4 = almost always*) in response to the question, "How often, being angry, do you . . . ?" Factor structure and reliability information are in the Results.

Procedure

This research was conducted as approved by institutional review processes. The head teacher from the middle school gave consent for individual youth participation. Students' participation was completely voluntary, free of risk (the task consisted on answering an anonymous questionnaire), and they could decline of participating at any moment without penalty.

Because the ML-STAXI has not been administered to Mexican middle school students, we explored if the students understood the items. The third author administered the inventory to 10 students and instructed them to answer items and tell him whether items were clear or not. When items were difficult to understand, students suggested ways to reword items but kept the meaning. Of the 44 original ML-STAXI items (Moscoso, 2000), nine were slightly reworded (items 9, 11, 13, 14, 19, 23, 34, 37, and 40). For example, item 13 (*Soy una persona exaltada*) was reworded to *Exploto fácilmente*; item 23 (*Contengo mi enojo por muchas horas*) to *Me guardo mi enojo por muchas horas*; and item 34 (*Pierdo los estribos*) to *Pierdo el control*. The word *cólera* which appears in five items was replaced with *enojo* (e.g., the item *Tengo un humor colérico* was rephrased to *Tengo un humor enojón)*, because *cólera* is rarely used in Mexico. Because the anger-in item of "I get

secretly very critical of others" was hard to understand, it was eliminated and replaced with two new items: "I get angry but I do not say it to anyone," and "I criticize others but I do not tell them." The modified inventory was administered to eight different students with the same instructions. Students reported no difficulties in understanding.

The third author received training from the first to administer the questionnaires. Teachers were present in the classrooms (30 to 40 students) but did not participate in the administration of the questionnaire. The third author proceeded as follows. After students were in silence, he gave the questionnaires and asked one of the students to read out loud the introduction (what the questionnaire was about and anonymity of the answers) and the instructions which explicitly indicated to ask the third author for clarification of items if needed. Then the third author read out loud the items about identification data which the students responded. Finally, he requested to continue with the other items in silence. None of the students refused to answer the questionnaire. Upon completing the questionnaires, students were thanked for participation.

The software to analyze data was the Statistical Package for the Social Sciences (SPSS 10).

Results

Missing Data

From the 512 questionnaires administered, eight were discarded because one or more pages did not have answers. The 504 remaining questionnaires were examined to detect items with missing data. The ML-STAXI-MS and the QAEPA items with missing data ranged from 0 to 3.6% (M = 1.34, SD = 0.72), and from 1.6 to 4% (M = 2.8, SD = 0.78), respectively. We used means to replace missing data (Roth, 1994), which is an adequate procedure when less than 10% of data are missing (Donner, 1982).

Exploratory Factor Analyses

To conduct factor analyses, we followed the same conceptualization of anger constructs embedded in the ML-STAXI in Latin American adults (Moscoso & Spielberger, 1999). That is, we examined the three ML-STAXI-MS scales separately: state anger, trait anger, and anger expression. We used exploratory factor analysis (EFA), specifically, the principal factor method (Fabrigar, Wegener, MacCallum, & Strahan, 1999). This method examined the underlying structure of the ML-STAXI-MS and identified latent variables or

Table 1. Factor Analysis of the State Anger Scale Items.

Item	Factor 1	Factor 2
2. I am angry	0.95	
1. I feel I am angry	0.86	
4. I am furious	0.69	
9. I am annoyed	0.69	
3. I feel irritated	0.46	0.11
8. I feel like beating someone		0.91
7. I feel like hitting somebody		0.87
6. I feel like insulting someone		0.72
10. I feel like destroying something	0.30	0.54
5. I feel like breaking things	0.25	0.51
Eigenvalues	5.57	1.21
Percentage of variance	55.75%	12.55%
α reliabilities	0.86	0.88

Note. All the .00 values were omitted.

dimensions. In addition, EFA arrives at a parsimonious representation of the associations among measured variables (Fabrigar et al., 1999). Oblique, rather than orthogonal, promax rotation was used because factors were likely correlated (Fabrigar et al., 1999) and to obtain theoretically meaningful constructs (Hair, Anderson, Tathan, & Black, 1998). Genders were combined to maximize the reliability of factors by having the highest ratio of participants to the number of items analyzed.

We employed three criteria to obtain factors. First, latent roots or Eigenvalues had to be greater than 1. The rationale was that any individual factor should account for variance of at least a single variable if it is to be retained for interpretation (Hair et al., 1998). Second, items should fit conceptually in a single factor, such that the factor loadings should correlate with the factor they represent (Nunnally & Bernstein, 1995). And third, the factor should have acceptable reliability, above .69.

The EFA on the 10-item State Anger Scale yielded two 5-item factors with Eigenvalues greater than 1, and accounted for 67.91% of the variance (Table 1). Factors were conceptually clear and distinct from each other. The first factor (α = .86) reflected angry feelings or the intensity of the emotion (e.g., "I am furious"), and the second (α = .88) indicated the momentary desire to express anger physically (e.g., "I feel like beating someone") and verbally (e.g., "I feel like insulting someone"). These two factors replicated the state factor structure of the ML-STAXI from other Mexican samples (Alcázar et al.,

Table 2. Factor Analysis of the Trait Anger Scale Items.

Item	Factor 1	Factor 2
20. I have an angry mood	0.81	
11. I am very temperamental (grumpy)	0.74	
15. I get angry very easily	0.71	0.10
13. I blew up easily	0.71	0.13
12. I have an irritable character	0.71	
18. It makes me furious when I do a good job and people do not give value to it	–0.14	0.79
16. It makes me furious when I am criticized in front of other people		0.63
14. I get angry when I do something well and it is not appreciated		0.60
19. I get mad when someone screws up my plans		0.57
17. It makes me furious when I do stupid mistakes		0.55
Eigenvalues	4.53	1.41
Percentage of variance	45.35	14.15
α reliabilities	0.86	0.77

Note. All the .00 values were omitted.

2011, 2012). The Cronbach's alpha reliability for combining both scales into a single 10-item State Anger Scale (Moscoso & Spielberger, 1999) was .91.

The EFA on the 10-items from the Trait Anger Scale (Table 2) yielded two factors which accounted for 59.50% of the variance. The first 5-item factor (α = .86) measured angry-temperament or the propensity to react with anger generally before any provocation (e.g., "I have an irritable character"). The second 5-item factor (α = .77) indicated angry-reaction or the disposition to respond with anger when facing frustrating situations (e.g., "I get mad when someone screws up my plans"). These two factors replicated the factor structure of the Trait Anger Scale in other Mexican samples (Alcázar et al., 2011, 2012). The alpha reliability for the 10-item Trait Anger Scale was .86.

The EFA on the 25 anger expression items yielded a 5-factor solution accounting for 55.21% of the variance. The seven anger-in items did not form a clear, reliable solution. The solution was not valid because one of the factors mixed six items of anger-out (e.g., "I show my anger to other people") with three anger-in items (e.g., "I get more angry than people knows"). To

Table 3. Factor Analysis of the Anger Expression and Control Items.

Item	F1	F2	F3
39. I try something relaxing to calm down	0.89	–0.13	
41. I try to calm down as soon as possible	0.80		
38. I try to relax	0.77		
40. I reduce my anger as soon as possible	0.70		
37. I try something to calm down	0.62		
42. I breathe deeply to relax	0.60		
44. I keep control	0.48	0.27	
21. I control my angry mood		0.69	
25. I stay calm		0.64	
27. I control the way I react		0.63	
30. I can control myself before being in bad mood		0.59	
36. I control my angry feelings	0.15	0.52	
26. I show my anger to other people			0.73
22. I express my anger			0.66
43. I express my angry feelings			0.62
34. I lose control			0.62
28. I argue with others			0.56
35. If somebody bothers me, I tell him/her how I feel	0.13		0.35
Eigenvalues	5.86	2.71	1.20
Percentage of variance	32.60	15.08	6.68
α reliabilities	0.88	0.78	0.75

Note. All the .00 values were omitted.

increase conceptual clarity, we kept anger-out items because they had higher loadings and dropped the three anger-in items. In the next EFA which accounted for 54.14% of the variance, the four remaining anger-in items formed a single factor, but its alpha reliability was unacceptably low at .59. We eliminated these four items and ran again the EFA which yielded three factors accounting for 54.37% of the variance. This final factor solution (Table 3) was conceptually clear and had acceptable reliabilities. The first 7-item factor reflected anger control-in or the emotional efforts to reduce the own anger through things like relaxing or breathing deeply. The second 5-item factor showed anger-control-out to assess behavioral attempts to

Table 4. Correlations Between ML-STAXI-MS Scales and Aggressive Anger Expression.

Measures	1	2	3	4	5	6	7	8	9
1. Feeling anger	—								
2. Desire	.65								
3. State anger	.90	.91							
4. Temperament	.48	.40	.48						
5. Reaction	.35	.34	.38	.53					
6. Trait anger	.47	.42	.49	.87	.87				
7. Control-in	–.09	–.06	–.08	–.24	–.01	–.14			
8. Control-out	–.05	–.04	–.05	–.25	–.06	–.18	.64		
9. Anger-out	.48	.48	.53	.60	.48	.61	–.10	–.10	
10. Aggress exp.	.24	.39	.35	.25	.19	.26	–.17	–.14	.28

$r > .08$, $p < .05$. $r > .09$, $p < .01$. $r > .15$, $p < .001$.
Note. ML-STAXI-MS = Multicultural Latin American Inventory of Anger Expression and Hostility for middle school level. Desire = desire to express anger physically and verbally. Reaction = trait anger reaction. Temperament = trait anger temperament. Aggress exp. = aggressive anger expression.

control one's own behavior when angry (e.g., "I control the way I react"). And the third 6-item factor reflected the anger-out or outward expression to show others that one is angry (e.g., "I argue with others").

The final 38 items (10 state items, 10 trait items, and 18 anger expression items) were labeled the ML-STAXI-MS with MS reflecting "middle school."

The EFA on QAEPA items revealed a 2-factor solution with Eigenvalues above 1 (Eigenvalues = 2.43 and 1.40) which accounted for 34.8 and 20% of the variance, respectively. One 4-item factor ($\alpha = .72$; items: (e), (d), (b), and (g); factor loadings: .74, .64, .51, and .50, respectively) assessed physically aggressive anger expression toward others (e.g., hit someone). The second 3-item factor had an unacceptably low reliability ($\alpha = .53$), and was dropped.

Correlations Between Measures

The ML-STAXI-MS scales and the aggressive anger expression measure correlated in logical ways (Table 4). Anger control scales correlated negatively with other measures, indicating that higher anger management is associated with less state anger, trait anger, anger-out, and aggression toward others. As expected, state anger was highly related to its subscales, feeling-anger and desire to express anger physically and verbally. The same was true for trait anger which was highly related to its subscales, angry-temperament, and angry-reaction. The state anger and trait anger scales were moderately correlated.

Aggressive anger expression (e.g., hitting) formed small to moderate correlations with ML-STAXI-MS measures, suggesting it measured a construct not captured by the ML-STAXI-MS. Aggressive anger expression and anger-out formed small negative correlations with anger control measures accounting for 1.0% to 2.6% of shared variance, suggesting that these measures are somewhat orthogonal and not opposite ends of a continuum. In summary, the small to moderate correlations between measures provide evidence of construct validity for measures and suggest that measures are somewhat independent and assess different constructs or aspects of anger and anger expression.

Discussion

The present study developed a valid version of the ML-STAXI (Moscoso, 2000; Moscoso & Spielberger, 1999) to measure anger in Mexican adolescents of middle school: the ML-STAXI-MS. Although the current sample is not representative of Mexican middle school youth in general, the study provides a first step at instrument development from which the inventory can be broadened to and evaluated in more representative national samples.

Exploratory factor analysis yielded seven factors to measure anger in adolescents of middle school, whereas in other Mexican samples nine factors emerged in high school students (Alcázar et al., 2012), and nine factors in adults (Alcázar et al., 2011). Four factors in the present study (desire to express anger physically and verbally, angry feelings, temperament, and reaction) were identical factors (i.e., included the same items) as those obtained in other studies of ML-STAXI in Mexican samples (Alcázar et al., 2011, 2012). The other three factors (anger-out, anger control–in and –out) were similar to previous studies with the ML-STAXI (Alcázar et al., 2011, 2012; Moscoso, 2000; Moscoso & Spielberger, 1999) but did not include the same number of items. In addition, items that assessed the desire to express anger verbally and physically loaded together, as found in other Mexican samples (Alcázar et al., 2011, 2012; Oliva Mendoza et al., 2010).

Anger-in items failed to form a reliable measure for middle school Mexican youth. This may reflect a developmental process wherein anger suppression is not fully developed until later, hence items did not load together. It may also reflect a partial mixture of constructs in the anger-in items. That is, suppressing anger may be related to but separable from harboring grudges and other ruminative processes. If this is the case, then mixing a small number of items tapping both anger suppression and angry ruminative processes may have resulted in a low reliability factor. As another possibility, the current anger-in items were not appropriate to capture this construct (if it exists)

in the studied sample. Future studies should explore forms of anger suppression and angry rumination in Mexican adolescents to obtain potential items to measure this concept.

Alpha reliabilities in the ML-STAXI-MS ranged from .75 to .91, which is similar to reliabilities found with the ML-STAXI in other samples (Alcázar et al., 2011, 2012; Moscoso, 2000; Moscoso & Spielberger, 1999). Correlational findings were also consistent with the literature (Alcázar et al., 2011, 2012; Deffenbacher et al., 1996; Moscoso, 2000) which demonstrates that anger measures correlate moderately and are therefore somewhat independent and that forms of anger expression (anger-out and controlled expression) are somewhat orthogonal to each other, rather than being highly correlated.

The QAEPA measured physically aggressive expression of anger toward others. The QAEPA had generally low correlations with the ML-STAXI-MS scales, suggesting the QAEPA captures aggressive forms of anger expression, not assessed by the ML-STAXI-MS. Because physical anger expression may have a negative impact for adolescents and the social environments in which they live, future studies should develop more items to build more extensive measures of physical aggressive expression to better understand anger in adolescents. Such measures may also assess whether there are related but conceptually separable forms of aggressive anger expression such as physically aggressive anger expression toward people and toward objects, and the environment. It may also be useful to follow the QAEPA format and see if verbally aggressive anger expression might be identified.

These are some implications of developing a valid version of an inventory to measure anger in Mexican adolescents of middle school level, the ML-STAXI-MS. First, this is the first study to validate an anger inventory in a Mexican middle school sample based on a broadly accepted measure, the state-trait anger expression inventory (Kerr & Schneider, 2008; Moscoso & Spielberger, 1999; Spielberger, 1988). Other anger inventory exists for middle school level (Del Barrio et al., 2005), but it was validated with samples from Spain; and the social and cultural differences may outweigh the similarities between Hispanic countries (Spielberger, Moscoso, & Brunner, 2005). Second, the words and items in the ML-STAXI-MS fit the language of Mexican students, at least from Mexico City. We slightly reworded items following students' suggestions but keeping the meaning. Third, because anger is a frequent emotion across the lifespan (Tangney et al., 1996), and adolescents are more likely to experience anger than older individuals (Blanchard-Fields & Coats, 2008), the validation of an inventory to measure anger in adolescents becomes relevant. And fourth, the ML-STAXI-MS may contribute with other instruments to the psychological assessment of adolescents.

As a theoretical implication, the ML-STAXI-MS had a factor structure that is similar to the one obtained in other samples from Mexico (Alcázar et al., 2011, 2012, Moral de la Rubia et al., 2010; Oliva Mendoza et al., 2010) and from other countries (Del Barrio et al., 2005; Kassinove et al., 1997; Maxwell et al., 2009; Spielberger, 1988). This suggests cross-national generalization of the state-trait model (Spielberger, 1988, 1999), and generalization of the factor structure across Mexican samples.

However, the study has limitations. Because we did analyses with participants from one school, future studies should replicate the results in other Mexican middle schools. Confirmatory factor analyses on new samples may inform if current findings are stable and solid. But, even if the present results replicate in other Mexican samples, it cannot be assumed that the inventory is valid for other countries, even if Spanish is the language used. In addition, new research should consider anger assessment with different strategies to self-report (e.g., direct observation) to explore convergent validity of the ML-STAXI-MS.

Although more research is needed, the ML-STAXI-MS might be useful to detect cases that potentially need to participate in anger management programs. Such detection has been traditionally made with individuals who scored above the percentile 75 in the Trait Anger Scale (DiGiuseppe & Tafrate, 2003). If the ML-STAXI-MS is used to detect cases, that percentile is represented by raw scores above 22 for men, and above 26 for women in the Trait Anger Scale.

The ML-STAXI-MS measures different facets of anger: state anger, trait anger, anger-out, and anger control. This might be useful for intervention design in the real world because treatments may emphasize the facet where anger is more problematic. For instance, meta-analytic evidence (Del Vecchio & O'Leary, 2004) shows that the most effective approach for high state anger is relaxation; and for the treatment of trait anger, anger-out, and anger control, cognitive behavior therapy. Trait anger has also been effectively reduced with relaxation techniques or cognitive therapy.

In summary, results from EFAs and correlations suggest the ML-STAXI-MS as adapted and revised in this study for Mexican adolescents of middle school has adequate reliability and sufficient construct validity to measure anger. Moreover, aggressive anger expression as captured in the QAEPA assessed another important construct not readily identified in the ML-STAXI-MS.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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