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Initial Development of a Racial Battle Fatigue Scale Using Exploratory Factor Analysis

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Abstract

While modern day higher education institutions tout their welcoming environment for Students of Color, historical patterns of exclusion, neglect, and a poor multi-cultural emphasis throughout the administration, policy development, and classroom experiences become settings for racial microaggressions. The term Racial Battle Fatigue (RBF) is used to describe three major stress responses (physiological, psychological, and behavioral) and also the energy expended on coping with and fighting against racism that is exacted on racially marginalized and stigmatized groups. In this study, exploratory factor analysis was used in the initial development of a scale to measure the three main stress responses of RBF using data collected from a prospective national study of 931 current and prior students. A 3-factor 41-item model was found to be the optimal solution to describe RBF. Given the preliminary properties and promising features of this RBF instrument, future research can be conducted using item response theory (IRT) to further validate the instrument and to establish norms for subgroups of students with different characteristics.

Background and Introduction

Underrepresented students (URS) of color live a life filled with racialized paradoxes. On the one hand, they are told that institutions of higher learning--particularly historically White institutions (HWIs)--are places where, through hard work, they can achieve the so-called American dream. Yet, for many of these Students of Color, HWIs represent a campus racial climate that is replete with subtle and overt forms of racism and blocked opportunities not unlike the urban environments that many navigated prior to their arrival to a postsecondary campus. Upon arrival to these campuses, they soon learn that racism, in its contemporary form, is pervasive; that the environment is patterned after a predominantly White cultural way of life, which causes identity development stressors for many Groups of Color; and stereotyping and marginalization, or "racial microaggressions" toward People of Color are prevalent on these post-secondary campuses. Though modern day higher education institutions tout their welcoming environment for Students of Color (e.g., consider most university mission statements), historical patterns of exclusion, neglect, and a poor multi-cultural emphasis throughout the administration, policy development, and classroom experiences become settings for racial microaggressions (Smith, 2009a; Smith, Yosso, & Solórzano 2006; Smith, Allen, & Danley, 2007).

Smith (2009a) asserts that RBF occurs over time in response to daily racial microaggressions. An individual exhibits minimally three stress responses in reaction to RBF: psychological, physiological, and behavioral (Smith, 2009b). Psychological stress responses may include frustration, anger, resentment, or fear. Physiological stress responses may include headaches, heart palpitations, high blood pressure, or sleep disturbances. Finally, stereotypical behavioral responses to RBF may be feeling threatened, impatience, increased use of alcohol or drugs, or poor school performance due to academic disidentification.

Until recently, most research on RBF in post-secondary settings has been exclusively qualitative. Some quantitative research has emerged in the fields of psychology and medicine on racism on university campuses (Pieterse, Carter, Evans, & Walter, 2010). These studies investigated race-related stress on college campuses using various quantitative scales, but none of these scales capture the subtleness of RBF and the nuanced experiences of college-going Students of Color due to lack of detailed analyses among other reasons. As a result, the scales are not necessarily appropriate and much work is needed to construct a proper and validated RBF scale. This study examined, on an item-by-item basis, the responses to a RBF Scale put together by our team. The main objective was to present initial investigation of the factor structure and reliability of the RBF Scale. The long-term aim of this study is to develop a comprehensive RBF Scale that researchers and policy makers can utilize to better prepare their campuses for the changing demographics and better serve the diversifying student body.

Methods

Initial Item Development

The RBF framework focuses on three domains: psychological, behavioral, and physiological stress responses. Our research team specifically constructed a quantitative measure of RBF in the higher education setting to capture these three domains. The first step in developing the RBF items involved reviewing relevant literature that provided information on existing instruments that were already available (Smith, 2009a; Smith, 2009b; Smith, Allen, & Danley, 2007; Smith, Hung, & Franklin, 2011; Smith, Yosso, & Solórzano 2006) . Using an iterative process, our team selected and revised relevant items as well as drafted new ones. We conducted both expert and user reviews to assess content validity. The initial RBF scale constructed contained 61 items for measuring race-related stress responses - 17 psychological items, 23 behavioral items and 21 physiological items (see Appendix 1). Each item consisted of five response options: (1) Never; (2) Almost never; (3) Sometimes; (4) Fairly often; (5) Very often.

Data Collection

This was a prospective study of 913 undergraduates, graduate students, and prior graduates in various regions of the United States. We enrolled participants from all racial groups, gender, and educational levels. This allowed us to check the performance of the scale in various groups of people by region and by race and gender. Comprehensive assessment of participants' self-reported race-related stress levels were performed.

Every person over the age of 18 that attends or has attended a US university/college was eligible to participate. Participation was completely voluntary. To recruit current undergraduate and graduate students, our team contacted faculty colleagues around the US willing to have their students complete a questionnaire. If they agreed, we requested the students' consent and had them complete the survey on-line or using a paper and pencil format. In the case of an on-line format, participants were directed to a secured website where the PIs had established a specific, password protected study site that administered the items. In the case of the paper format, a faculty member or a research assistant at the respective university administered the survey in his or her classroom. To recruit prior graduates, we used institutional or organizational listservs to recruit volunteers for the on-line questionnaires. A subset of participants was interviewed by phone and in person prior to administering the study to assess the content validity of the scale. The open-ended interviews asked participants to discuss items that were confusing on the instrument. This initial instrument was administered among ten US universities as part of a larger study approved by the Institutional Review Board and funded by an interdisciplinary grant lead by joint PIs (Dr. William A. Smith and Dr. Man Hung) from the University of Utah.

Statistical Analysis

An exploratory factor analysis (Tabachnick and Fidell, 2001), was done on 61 items of the initial RBF survey (See Appendix 1). The Kaiser-Meyer-Olkin (KMO) index was used to investigate sampling adequacy, which measures item partial correlations. A KMO value of at least 0.5 signals appropriateness to proceed to factor analysis. In the present study, we decided to use the principal axis factoring method with varimax orthogonal rotation to obtain the initial factor solution and for subsequent analyses. The varimax orthogonal rotation allows factors to be uncorrelated with each other and hence maximizes some item loadings on one factor while being minimized on other factors. The number of factors retained were initially determined by theory in consideration of eigenvalues greater than one and visual inspection of the scree plot. Inspection of the highest loading items for each factor would help confirm content validation of the scale. In general, item loadings less than 0.55 on any factor or items that failed to load uniquely (i.e., cross-loadings > 0.25) on a factor were eliminated.

Item internal consistency reliability, which reflects the homogeneity of items within a scale, was also assessed. Cronbach's alpha coefficient, ranging from 0 to 1, is commonly used to measure internal consistency reliability. A higher alpha coefficient generally corresponds to higher item correlations within the scale. Typically, an alpha of 0.8 or greater is considered satisfactory. Any items that could potentially weaken the Cronbach's alpha were excluded.

We expected to eliminate about one fourth of the items, resulting in a revised RBF scale consisting of approximately 45 items.

Results

Demographics

Undergraduates were mainly targeted to take the survey and thus comprised the majority of participants (73.8%, n=674). The rest of the participants were either graduate students (13.6%, n=124) or were no longer in school but had some college education (12.6%, n=115). Freshman encompassed the majority of participants (33.8%, n=309). There were more female respondents (59.1%, n=540) than male respondents. Participants' ages ranged from 18 to 82 years with the majority being 19 (24.8%, n=226) and 20 (18.6%, n=170) which corresponded to the freshman majority of respondents. Of the 913 respondents, 161 (17.6%) self-identified as multiracial. 264 (28.9%) self-identified as 'Other White,' 238 (26.1%) self-identified as European American, and 208 (22.8%) self-identified as African American/Black. See Table 1 for detailed demographic information.

Sampling Adequacy

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.966. The Bartlett's Test of Sphericity was ($p < .001$). Together, the KMO and Bartlett's test statistics indicated that factor analysis assumptions had been met and the data were suitable for factor analytic procedures.

Item-level Analysis

The range of responses for all items was 1 to 5. Maximum and minimum mean scores were 3.05 and 1.24 respectively. Five of the 61 items were negatively skewed. Kurtosis statistics ranged from -1.276 to 10.060 with a standard error of 0.162 (See Table 2).

Exploratory Analysis

The scree plot (Figure 1) was visually inspected in the beginning to guide decisions on retaining factors (Catell, 1966). Visual inspection of the scree suggested that there were three or four factors; however eight factors had eigenvalues greater than 1 per Kaiser criterion. The break in the scree plot was easily distinguished near the bend around the fourth factor while the rest were unclear. Since the Kaiser criterion tended to over-extract factors (Bandalos & Boehm-Kaufman, 2009), we decided to begin our investigation with a four-factor model. No items were dropped in the subsequent analysis of the four-factor model.

Four-factor Model-61 items

The four-factor model was examined using exploratory factor analysis and was found to describe 57.89% of the variance of the intercorrelation matrix. The first four factors had eigenvalues of 23.50, 7.07, 4.36, and 1.90. The viability of the four-factor model remained questionable due to cross-loading across multiple items. The varimax orthogonal rotation model was also examined to clarify item ambiguities. A factor structure appeared but contained many ambiguous items (See table 3).

Three-factor Model-61 Items

A three-factor model with 61 items was also examined using exploratory factor analysis. The model described 55.10% of the variance of the intercorrelation matrix. The eigenvalues for the three factors were 23.50, 7.07, and 4.36. A more interpretable factor structure appeared (See table 4). Related items belonging to factor 3 that either cross-loaded ($>.25$) or had values <0.55 were initially discarded since the items belonging to factor 3 grouped together the least. Eighteen items (items 18-26, and 32-40) were dropped based on this criteria. Interestingly, the remaining five items appeared to be associated with behavioral-substance use.

Three-factor Model-43 Items

The three-factor forty three item model described 54.72% of the variance of the intercorrelation matrix. The KMO remained adequate at 0.953 while Bartlett's Test remained significant ($p < .001$). Factor 1 had an eigenvalue of 15.08, factor 2 had an eigenvalue of 6.37, and factor 3

had an eigenvalue of 3.29 while their percent variance contribution was 25.74%, 20.51%, and 8.47% respectively. Most extraction communalities in the rotated model were in the high range with a minimum of 0.560 and a maximum of 0.884. Items with factor loadings less than 0.55 were considered for elimination. A more interpretable factor structure (See table 5) emerged with seventeen items hypothesized to be associated with psychology loaded on the first factor, five items hypothesized to be associated with behavior loaded onto the third factor, and the remaining twenty one items hypothesized to be associated with physiology loaded onto the second factor. Items were further considered for elimination in all factor groups based on the criteria described in the four-factor model. A three-factor model was reanalyzed with the following items eliminated (11, 58). Items 30, 42, and 50 remained despite meeting our technical criteria for elimination because the items conceptually fit together or were uniquely distinct.

Three-factor Model-41 Items

The second three-factor model was re-run with the remaining 41 items (Appendix 2). This model described 55.43% of the total variance of the intercorrelation matrix of which 35.58% was described by factor 1, 15.19% by factor 2, and 7.73% by factor 3. The items remained appropriate for factor analysis (KMO =0.951; Bartlett's Test ($p < .001$)). The eigenvalues were 14.41, 6.27, and 3.24 with a well-defined factor structure (see table 6). Items hypothesized to be associated with psychology, physiology, and behavior were clearly loaded into factors 1, 2, and 3 respectively. Cronbach's alpha coefficient for factor 1 (Psychology) for this model remained 0.968 with mean =38.54 and SD =16.80. Factor 2 (Physiology) had a Cronbach coefficient of 0.937 with mean =44.54 and SD =15.59 while factor 3 (Behavior) had Cronbach alpha coefficient =0.894 and mean=6.76 and SD=3.25.

Two-factor Model-41 Items

A two-factor model was analyzed to confirm best-fit of the three-factor model with 41 items. Factor 1 accounted for 26.91% of the variance of the intercorrelation matrix, while factor 2 accounted for 21.31%. KMO =0.951 and Bartlett's test ($p < .001$) indicated that the items were appropriate for factor analysis. Eigenvalues for factor 1 and factor 2 were 14.41 and 6.27 respectively. Items hypothesized to be associated with psychology and physiology fitted well into factor 1 and 2 respectively (All items had loadings of 0.563 or higher). Items associated with behavior were ambiguous and cross loaded fairly evenly across the two factors and had loadings that ranged from 0.202 to 0.398. Therefore, the two-factor model was not supported (See table 7).

Discussion

While there is much literature discussing RBF, few studies have quantitative ways of measuring RBF until recently (Pieterse et al. 2010). In this study, data obtained through a prospective national cohort were examined to develop a RBF Scale for future quantitative research. Initial results of the exploratory factor analysis suggested that RBF is more complex than initially hypothesized by yielding eight factors with eigenvalues greater than 1; however, only three or four factors were distinguishable through visual inspection of the scree plot (Figure 1). Comparison of factor structures obtained from the 4-factor and the 3-factor analyses on all 61 items suggested that a 3-factor model best fitted the data (Table 3, 4). Inspection of the 3-factor structure suggested items relating to psychology belonged to factor 1, items relating to physiology belonged to factor 2, while items relating to behavior loosely (due to low load values and cross loading) belonged to factor 3. Initial elimination of items among factor 3 (due to those items fitting the model least) with poor load values (<0.55) or cross-loaded items (>0.25) yielded a factor structure highly suggestive of a 3-factor solution (Table 5). Further elimination of items 11 and 58 among factors 1 and 2 to refine the 3-factor model yielded a more conclusive factor structure (Table 6). A 2-factor model with the remaining 41 items was analyzed to confirm best-fit of the 3-factor model. Indeed, the results indicated two highly fitted factors, psychology items with factor 1 and physiology items with factor 2, while behavioral items cross loaded among the two factors fairly evenly indicating that the items fitted the 3-factor 41-item model the best (Table 7).

The models generated in this study are based on classical test theory (CTT) and have the strengths and limitations of CTT. Of importance, the scale developed through CTT is sample dependent and may not be applied to the general population; hence, further testing is needed if the scale is to be used broadly. Given the preliminary properties and promising features of the RBF instrument, future research can be conducted using item response theory (IRT) to further validate the instrument and to establish for norms for subgroups of students with different characteristics.

Underrepresented students of color are often promised some version of the “American dream” through attainment of higher education from hard work and perseverance. Often this promise cause URS to face environments filled with gendered racism, blocked opportunities, and mundane, extreme, environmental stress (MEES) in pursuit of this dream. These environments include contemporary education professional institutions, professional institutions, and historically white institutions where RBF has been documented to be found more than anywhere else (Smith, et al. 2007). There is much literature discussing RBF, but few studies have quantitative ways of measuring RBF (Pieterse et al. 2010). Developing and validating a scale appropriate for RBF study is an important first step in assessing and furthering the research of racial microaggressions and thereby contributing to alleviation of economic, intellectual and moral poverty. By far, few, if any, instruments encompass the full spectrum of race-related

stress responses. A comprehensive measure of various RBF domains will reflect the nation's current priority and emphasis in better planning and serving students from diverse backgrounds.

Acknowledgements

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Figures and Tables

Figure 1: Scree plot of the 61-item RBF instrument.

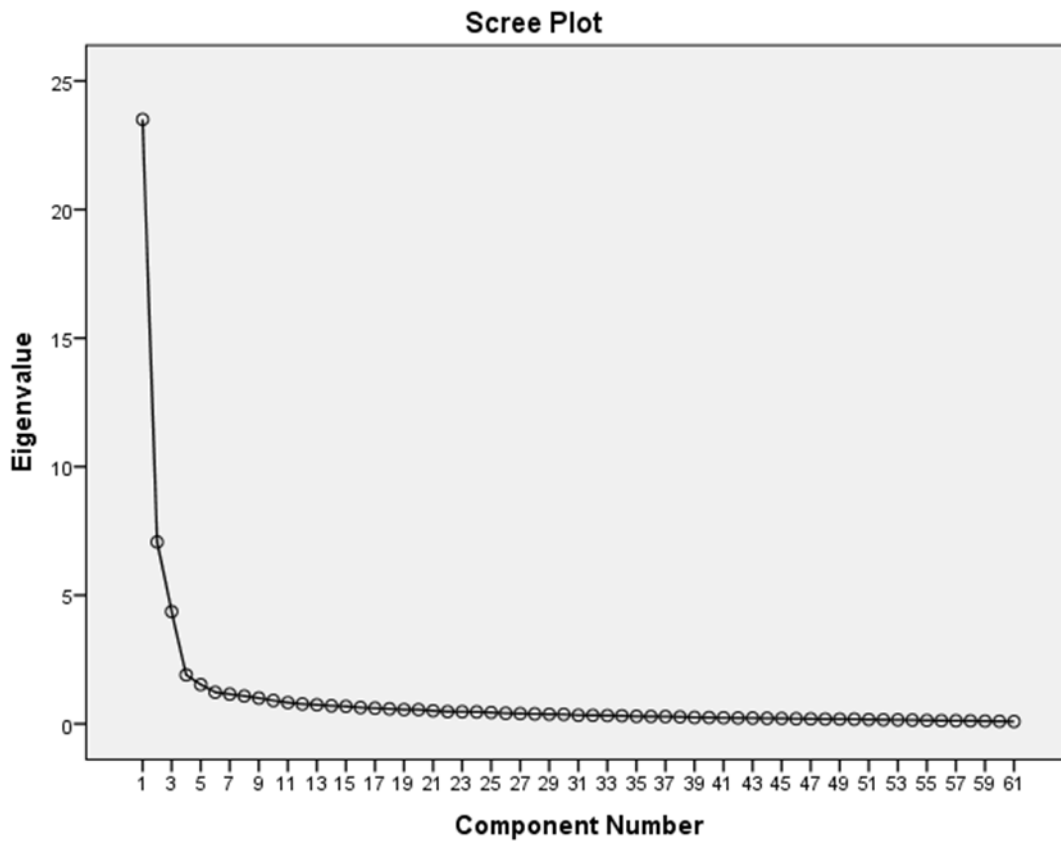


Table 1: Demographic characteristics of the participants (N=931).

Variable	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>	Range
Age			26.67	20	19-64
Gender					
Male	370	40.5			
Female	540	59.1			
Transgender					
No	895	98			
Yes	13	1.4			
Sexual Orientation					
Heterosexual	855	93.6			
Bisexual	18	2			
Gay	14	1.5			
Queer	8	0.9			
Lesbian	4	0.4			
Level of college completed as of July 2012					
None	9	1			
Freshman	309	33.8			
Sophomore	152	16.6			
Junior	106	11.6			
Senior	51	5.6			
Bachelor's	122	13.4			
Masters	120	13.1			
PhD	33	3.6			
Professional Degree	6	0.7			
Undergraduate GPA (4.0 scale)					
A or A+	96	10.5			
A-	177	19.4			
B+	171	18.7			
B	198	21.7			
B-	121	13.3			
C+	85	9.3			
C	47	5.1			
D	11	1.2			
Multiracial					
No	745	81.6			
Yes	161	17.6			
Latina/o or Hispanic					
No	741	81.2			
Yes, Mexican American/Chicano	91	10			
Yes, Puerto Rican	9	1			
Yes, Central American	10	1.1			
Yes, other Latino or Hispanic	53	5.8			

Racially/Ethnically self-identify		
American Indian	49	5.4
Native Hawaiian	4	0.4
Pacific Islander	26	2.8
Asian American	50	5.5
East Asian (e.g. Chinese, Japanese, Korean, Taiwanese)	28	3.1
Southeast Asian (e.g. Cambodian, Vietnamese, Hmong, Filipino)	12	1.3
South Asian (e.g. Indian, Pakistani, Nepalese, Sri Lankan)	21	2.3
Other Asian	1	0.1
African American/Black	208	22.8
African	16	1.8
Other Black	7	0.8
Caribbean	29	3.2
European American	238	26.1
Middle Eastern	14	1.5
Other White	264	28.9
Racially/Ethnically self-identify		
American Indian	22	2.4
Native Hawaiian	4	0.4
Pacific Islander	21	2.3
Asian American	44	4.8
East Asian (e.g. Chinese, Japanese, Korean, Taiwanese)	16	1.8
Southeast Asian (e.g. Cambodian, Vietnamese, Hmong, Filipino)	6	0.7
South Asian (e.g. Indian, Pakistani, Nepalese, Sri Lankan)	23	2.5
Other Asian	5	0.5
African American/Black	192	21
African	8	0.9
Caribbean	15	1.6
Other Black	6	0.7
European American	200	21.9
Middle Eastern	15	1.6
Other White	262	28.7
Alaskan Native	1	0.1
Political Orientation		
Very Conservative	17	1.9
1	21	2.3
2	52	5.7
3	38	4.2
4	35	3.8

Moderate	306	33.5
6	77	8.4
7	107	11.7
8	104	11.4
9	73	8
Very progressive	58	6.4
Community Grown Up In		
A major city (over 500,000)	168	18.4
Large suburb of a major city (100,001 – 500,000)	123	13.5
Large city (100,001-500,000)	82	9
Midsized suburb (10,001-100,000)	212	23.2
Midsized city (10,001-100,000)	92	10.1
Small city or town (1,000-10,000)	126	13.8
Small suburb (1,000-10,000)	71	7.8
Rural area (under, 1,000)	39	4.3
Community Diversity		
All white	66	7.2
Mostly White	470	51.5
About half and Half	175	19.2
Mostly minorities	114	12.5
All minorities	83	9.1
High School Description		
Large, public (Over 2,000)	326	35.7
Midsized, public (500-2,000)	348	38.1
Small, public (Under 500)	72	7.9
Large, private (Over 2,000)	8	0.9
Midsized, private (500-2,000)	85	9.3
Small, private (Under 500)	69	7.6
Friend Diversity (Growing up)		
All White	94	10.3
Mostly White	394	43.2
About half and half	194	21.2
Mostly minorities	150	16.4
All minorities	72	7.9
Elementary School Diversity		
All White	99	10.8
Mostly White	466	51
About half and half	152	16.6
Mostly minorities	112	12.3
All minorities	78	8.5
High School Diversity		
All White	48	5.3
Mostly White	489	53.6

About half and half	215	23.5
Mostly minorities	110	12
All minorities	44	4.8
Work Diversity		
All White	70	7.7
Mostly White	477	52.2
About half and half	170	18.6
Mostly minorities	70	7.7
All minorities	15	1.6
Does not apply	107	11.7
Religious Identification		
Baptist	111	12.2
Buddhist	21	2.3
Church of Christ	37	4.1
Eastern Orthodox	9	1
Episcopalian	12	1.3
Hindu	10	1.1
Jewish	35	3.8
LDS (Mormon)	50	5.5
Lutheran	21	2.3
Methodist	36	3.9
Muslim	16	1.8
Presbyterian	20	2.2
Roman Catholic	265	29
Seventh Day Adventist	4	0.4
United Church of Christ/Congregational Other		
Christian	24	2.6
Other Religion	64	7
None	171	18.7
Combined Household Income Last Year		
Less than \$20,000	175	19.2
\$20,000 to \$29,999	64	7
\$30,000 to \$39,999	61	6.7
\$40,000 to \$59,999	123	13.5
\$60,000 to \$79,999	119	13
\$80,000 to \$99,999	96	10.5
\$100,000 to \$199,999	157	17.2
More than \$200,000	97	10.6
Main Parent/Guardian 1		
Mother	715	78.3
Father	168	18.4
Grandmother	13	1.4
Grandfather	1	0.1

Aunt	6	0.7
Uncle	1	0.1
Other	3	0.3
Main Parent/Guardian 2		
Mother	166	18.2
Father	577	63.2
Grandmother	28	3.1
Grandfather	7	0.8
Aunt	8	0.9
Uncle	5	0.5
Sister	5	0.5
Brother	2	0.2
Other	24	2.6
Not applicable	6	0.7
Main Parent/Guardian 1 Education		
High school diploma or less	261	28.6
Some college or postsecondary education	147	16.1
Associate degree	61	6.7
Bachelor degree	236	25.8
Some graduate or professional training	40	4.4
Graduate or professional degree (e.g., MA, PhD, MD, JD)	156	17.1
Not applicable	4	0.4
Main Parent/Guardian 2 Education		
High school diploma or less	267	29.2
Some college or postsecondary education	132	14.5
Associate degree	38	4.2
Bachelor degree	184	20.2
Some graduate or professional training	36	3.9
Graduate or professional degree (e.g., MA, PhD, MD, JD)	161	17.6
Not applicable	6	0.7
Higher education attending/attended		
Public, 2-year institution (community college)	17	1.9
Public, 4-year institution	731	80.1
Private (non-profit), 4-year institution (e.g. Harvard, Stan	131	14.3
Private (for profit), 4-year institution (e.g. University of	26	2.8
Is/was it a minority serving institution?		
No	803	88
Yes	107	11.7
Fraternity or Sorority		
No	662	72.5

Yes	250	27.4
Student Groups		
No	420	46
Yes	488	53.5
Paying for college (All that apply)		
Family contribution	538	58.9
Personal contribution/job	339	37.1
Need-based institutional grant	230	25.2
Pell grant	315	34.5
Academic scholarship	349	38.2
Athletics scholarship	31	3.4
Loans	482	52.8
Work hours/Week		
0 hours	312	34.2
1-5 hours	68	7.4
6-10 hours	117	12.8
11-15 hours	118	12.9
16-20 hours	133	14.6
More than 20 hours	160	17.5
Highest level of education intend to complete/completed		
Some college or postsecondary education	81	8.9
Bachelor degree	194	21.2
Some graduate or professional training	96	10.5
Graduate or professional degree (e.g., MA, PhD, MD, JD)	536	58.7
How close do you feel to:		
African Americans/Blacks		
Not close at all	71	7.8
1	47	5.1
2	65	7.1
3	40	4.4
4	48	5.3
Moderately close	196	21.5
6	44	4.8
7	74	8.1
8	83	9.1
9	56	6.1
Very Close	186	20.4
American Indian/Native American		
Not close at all	150	16.4
1	102	11.2
2	91	10
3	73	8

4	54	5.9
Moderately close	168	18.4
6	47	5.1
7	71	7.8
8	55	6
9	30	3.3
Very Close	52	5.7
Asian Americans		
Not close at all	150	16.4
1	102	11.2
2	91	10
3	73	8
4	54	5.9
Moderately close	168	18.4
6	47	5.1
7	71	7.8
8	55	6
9	30	3.3
Very Close	52	5.7
Latinas/os		
Not close at all	87	9.5
1	61	6.7
2	77	8.4
3	49	5.4
4	46	5
Moderately close	167	18.3
6	54	5.9
7	70	7.7
8	87	9.5
9	62	6.8
Very Close	131	14.3
European americans/Whites		
Not close at all	43	4.7
1	33	3.6
2	30	3.3
3	39	4.3
4	46	5
Moderately close	151	16.5
6	44	4.8
7	74	8.1
8	91	10
9	109	11.9
Very Close	237	26

Pacific Islanders

Not close at all	189	20.7
1	106	11.6
2	78	8.5
3	58	6.4
4	57	6.2
Moderately close	138	15.1
6	29	3.2
7	61	6.7
8	46	5.0
9	22	2.4
Very Close	58	6.4

Table 2. Item Level Descriptive Statistics.

Item	Range	Mean	Standard Deviation	Skewness	Skewness Standard Error	Kurtosis Statistic	Kurtosis Standard Error
1	1 to 5	2.85	1.33	-0.017	0.081	-1.147	0.162
2	1 to 5	2.28	1.245	0.586	0.081	-0.762	0.162
3	1 to 5	2.32	1.207	0.464	0.081	-0.775	0.162
4	1 to 5	3	1.41	-0.13	0.081	-1.252	0.162
5	1 to 5	2.64	1.333	0.239	0.081	-1.088	0.162
6	1 to 5	2.5	1.308	0.407	0.081	-0.966	0.162
7	1 to 5	2.47	1.289	0.432	0.081	-0.934	0.162
8	1 to 5	2.97	1.41	-0.069	0.081	-1.276	0.162
9	1 to 5	2.63	1.326	0.251	0.081	-1.077	0.162
10	1 to 5	2.03	1.157	0.995	0.081	0.115	0.162
11	1 to 5	1.79	1.003	1.174	0.081	0.69	0.162
12	1 to 5	2.15	1.211	0.782	0.081	-0.422	0.162
13	1 to 5	2.15	1.209	0.782	0.081	-0.403	0.162
14	1 to 5	2.02	1.168	0.984	0.081	0.028	0.162
15	1 to 5	1.95	1.101	0.997	0.081	0.17	0.162
16	1 to 5	2.4	1.275	0.454	0.081	-0.938	0.162
17	1 to 5	2.44	1.392	0.515	0.081	-1.008	0.162
18	1 to 5	2.04	1.141	0.818	0.081	-0.279	0.162
19	1 to 5	2.15	1.288	0.798	0.081	-0.533	0.162
20	1 to 5	2.01	1.278	1.039	0.081	-0.058	0.162
21	1 to 5	1.61	0.908	1.497	0.081	1.77	0.162
22	1 to 5	2.01	1.166	0.872	0.081	-0.26	0.162
23	1 to 5	2.13	1.142	0.661	0.081	-0.499	0.162
24	1 to 5	1.79	1.078	1.249	0.081	0.702	0.162
25	1 to 5	1.89	1.193	1.138	0.081	0.196	0.162
26	1 to 5	2	1.242	0.958	0.081	-0.295	0.162
27	1 to 5	1.4	0.846	2.281	0.081	4.719	0.162
28	1 to 5	1.24	0.615	3.014	0.084	10.06	0.167
29	1 to 5	1.3	0.741	2.824	0.084	8.231	0.167
30	1 to 5	1.53	0.925	1.737	0.081	2.239	0.162
31	1 to 5	1.34	0.78	2.538	0.081	6.306	0.162
32	1 to 5	1.8	1.114	1.292	0.081	0.778	0.162
33	1 to 5	1.9	1.139	1.032	0.081	0.069	0.162
34	1 to 5	1.74	1.072	1.354	0.081	0.967	0.162
35	1 to 5	1.66	0.97	1.397	0.081	1.219	0.162
36	1 to 5	1.81	1.168	1.332	0.081	0.763	0.162
37	1 to 5	1.65	0.978	1.526	0.081	1.735	0.162
38	1 to 5	1.53	0.875	1.707	0.081	2.461	0.162
39	1 to 5	1.53	0.874	1.662	0.081	2.325	0.162

40	1 to 5	1.8	1.119	1.244	0.081	0.596	0.162
41	1 to 5	2.9	1.088	-0.154	0.081	-0.539	0.162
42	1 to 5	2.14	1.222	0.733	0.081	-0.574	0.162
43	1 to 5	1.85	0.999	0.987	0.081	0.255	0.162
44	1 to 5	2.21	1.226	0.584	0.081	-0.821	0.162
45	1 to 5	1.99	1.076	0.765	0.081	-0.381	0.162
46	1 to 5	2.29	1.128	0.383	0.081	-0.793	0.162
47	1 to 5	2.23	1.127	0.588	0.081	-0.507	0.162
48	1 to 5	2.37	1.166	0.396	0.081	-0.761	0.162
49	1 to 5	2.09	1.101	0.702	0.081	-0.44	0.162
50	1 to 5	2.29	1.101	0.463	0.081	-0.62	0.162
51	1 to 5	1.98	1.068	0.988	0.081	0.297	0.162
52	1 to 5	1.96	1.097	1.03	0.081	0.302	0.162
53	1 to 5	2.39	1.245	0.469	0.081	-0.828	0.162
54	1 to 5	2.02	1.079	0.812	0.081	-0.193	0.162
55	1 to 5	2.68	1.336	0.176	0.081	-1.14	0.162
56	1 to 5	2.01	1.15	0.999	0.081	0.15	0.162
57	1 to 5	1.76	1.04	1.462	0.081	1.6	0.162
58	1 to 5	1.52	0.875	1.937	0.081	3.656	0.162
59	1 to 5	3.05	1.398	-0.16	0.081	-1.224	0.162
60	1 to 5	2.34	1.36	0.654	0.081	-0.816	0.162
61	1 to 5	1.91	1.043	1.049	0.081	0.523	0.162

Table 3: Factor loadings of the 4-factor model (61 items).

Item	Factor 1	Factor 2	Factor 3	Factor 4
1	0.294	0.806	0.141	0.003
2	0.427	0.693	0.175	0.016
3	0.235	0.515	0.169	0.070
4	0.220	0.815	0.091	-0.002
5	0.364	0.798	0.101	0.029
6	0.404	0.779	0.144	0.040
7	0.194	0.761	0.136	0.080
8	0.188	0.849	0.113	0.036
9	0.315	0.830	0.132	0.078
10	0.631	0.538	0.175	0.070
11	0.534	0.413	0.160	0.107
12	0.489	0.661	0.225	0.036
13	0.604	0.617	0.177	0.034
14	0.561	0.576	0.214	0.074
15	0.543	0.552	0.151	0.067
16	0.283	0.737	0.160	0.043
17	0.511	0.650	0.116	0.011
18	0.711	0.485	0.145	0.087
19	0.676	0.435	0.027	-0.012
20	0.506	0.317	0.004	0.074
21	0.642	0.251	0.201	0.243
22	0.694	0.430	0.166	0.111
23	0.537	0.481	0.136	0.140
24	0.716	0.299	0.183	0.219
25	0.764	0.281	0.220	0.169
26	0.753	0.285	0.163	0.174
27	0.341	0.065	0.119	0.797
28	0.269	-0.006	0.149	0.771
29	0.276	0.037	0.095	0.850
30	0.438	0.155	0.144	0.597
31	0.236	0.048	0.124	0.668
32	0.691	0.314	0.169	0.143
33	0.596	0.319	0.064	0.147
34	0.620	0.244	0.207	0.204
35	0.744	0.182	0.198	0.268
36	0.697	0.303	0.068	0.051
37	0.790	0.167	0.164	0.223
38	0.687	0.157	0.192	0.321
39	0.672	0.148	0.218	0.357
40	0.800	0.228	0.166	0.137
41	0.036	0.133	0.635	-0.047
42	0.126	0.107	0.547	0.037
43	0.128	0.061	0.636	0.087
44	0.129	0.144	0.587	0.009
45	0.194	0.065	0.627	0.058
46	0.204	0.088	0.632	0.037
47	0.056	0.021	0.592	0.013
48	0.067	0.085	0.720	-0.036

49	0.123	0.095	0.644	0.096
50	-0.032	0.074	0.515	0.086
51	0.092	0.054	0.674	0.069
52	0.024	0.106	0.577	0.142
53	0.059	0.149	0.644	-0.019
54	0.126	0.042	0.589	0.120
55	0.123	0.085	0.701	-0.029
56	0.092	0.076	0.708	0.032
57	0.138	0.124	0.577	0.176
58	0.233	0.053	0.446	0.195
59	-0.008	0.194	0.648	-0.064
60	0.135	0.033	0.621	0.067
61	0.188	0.030	0.659	0.122

Table 4: Factor loadings of the 3-factor model (61 items).

Item	Factor 1	Factor 2	Factor 3
1	0.838	0.154	0.035
2	0.796	0.181	0.163
3	0.544	0.177	0.103
4	0.813	0.107	-0.023
5	0.858	0.112	0.103
6	0.856	0.153	0.143
7	0.738	0.152	0.027
8	0.820	0.132	-0.026
9	0.854	0.147	0.096
10	0.737	0.169	0.382
11	0.578	0.155	0.365
12	0.791	0.228	0.229
13	0.801	0.175	0.320
14	0.740	0.213	0.326
15	0.712	0.149	0.313
16	0.765	0.172	0.070
17	0.795	0.117	0.229
18	0.721	0.136	0.462
19	0.679	0.017	0.379
20	0.487	-0.003	0.341
21	0.457	0.189	0.571
22	0.661	0.156	0.478
23	0.634	0.134	0.374
24	0.536	0.170	0.597
25	0.548	0.205	0.602
26	0.546	0.148	0.595
27	0.076	0.123	0.738
28	-0.014	0.152	0.688
29	0.020	0.103	0.722
30	0.224	0.143	0.674
31	0.034	0.128	0.591
32	0.551	0.156	0.524
33	0.515	0.055	0.455
34	0.447	0.195	0.531
35	0.434	0.181	0.676
36	0.560	0.055	0.466
37	0.449	0.145	0.680
38	0.378	0.178	0.678
39	0.357	0.204	0.694
40	0.523	0.148	0.614

41	0.137	0.637	-0.023
42	0.139	0.546	0.102
43	0.089	0.634	0.150
44	0.178	0.587	0.078
45	0.126	0.622	0.176
46	0.155	0.628	0.164
47	0.036	0.590	0.055
48	0.105	0.718	0.019
49	0.115	0.644	0.144
50	0.033	0.518	0.029
51	0.070	0.673	0.114
52	0.075	0.580	0.100
53	0.156	0.645	0.009
54	0.066	0.587	0.173
55	0.129	0.698	0.063
56	0.096	0.707	0.085
57	0.134	0.577	0.201
58	0.110	0.442	0.296
59	0.175	0.652	-0.081
60	0.071	0.617	0.147
61	0.081	0.654	0.223

Table 5: Factor loadings of the 3-factor model (43 items).

Item	Factor 1	Factor 2	Factor 3
1	0.837	0.149	-0.019
2	0.810	0.178	0.100
3	0.560	0.158	0.078
4	0.812	0.104	-0.039
5	0.866	0.117	0.044
6	0.871	0.160	0.079
7	0.759	0.151	0.033
8	0.824	0.121	-0.025
9	0.872	0.139	0.066
10	0.767	0.190	0.241
11	0.610	0.164	0.264
12	0.817	0.227	0.154
13	0.823	0.190	0.198
14	0.778	0.223	0.211
15	0.738	0.152	0.208
16	0.781	0.163	0.032
17	0.793	0.119	0.105
18	IE	IE	IE
19	IE	IE	IE
20	IE	IE	IE
21	IE	IE	IE
22	IE	IE	IE
23	IE	IE	IE
24	IE	IE	IE
25	IE	IE	IE
26	IE	IE	IE
27	0.171	0.115	0.847
28	0.083	0.161	0.786
29	0.118	0.101	0.884
30	0.300	0.152	0.686
31	0.111	0.136	0.685
32	IE	IE	IE
33	IE	IE	IE
34	IE	IE	IE
35	IE	IE	IE
36	IE	IE	IE
37	IE	IE	IE
38	IE	IE	IE

39	IE	IE	IE
40	IE	IE	IE
41	0.134	0.637	-0.048
42	0.150	0.546	0.069
43	0.121	0.636	0.111
44	0.182	0.589	0.048
45	0.159	0.639	0.106
46	0.173	0.647	0.092
47	0.060	0.603	0.035
48	0.113	0.726	-0.008
49	0.130	0.659	0.116
50	0.037	0.525	0.057
51	0.107	0.684	0.086
52	0.101	0.581	0.121
53	0.155	0.651	-0.014
54	0.094	0.583	0.146
55	0.137	0.704	0.006
56	0.116	0.715	0.071
57	0.166	0.590	0.199
58	0.144	0.461	0.275
59	0.176	0.651	-0.095
60	0.081	0.627	0.096
61	0.124	0.664	0.150

Note: IE=item eliminated.

Table 6: Factor loadings of the 3-factor model (41 items).

tem	Factor 1	Factor 2	Factor 3
1	0.842	0.147	-0.009
2	0.808	0.176	0.105
3	0.557	0.155	0.084
4	0.818	0.101	-0.029
5	0.869	0.115	0.051
6	0.871	0.158	0.083
7	0.762	0.149	0.040
8	0.831	0.116	-0.014
9	0.876	0.136	0.074
10	0.755	0.190	0.234
11	IE	IE	IE
12	0.812	0.227	0.152
13	0.817	0.190	0.193
14	0.771	0.223	0.208
15	0.731	0.151	0.209
16	0.783	0.161	0.038
17	0.790	0.117	0.113
18	IE	IE	IE
19	IE	IE	IE
20	IE	IE	IE
21	IE	IE	IE
22	IE	IE	IE
23	IE	IE	IE
24	IE	IE	IE
25	IE	IE	IE
26	IE	IE	IE
27	0.167	0.115	0.852
28	0.080	0.156	0.779
29	0.116	0.099	0.891
30	0.300	0.151	0.693
31	0.111	0.134	0.695
32	IE	IE	IE
33	IE	IE	IE
34	IE	IE	IE
35	IE	IE	IE
36	IE	IE	IE
37	IE	IE	IE

38	IE	IE	IE
39	IE	IE	IE
40	IE	IE	IE
41	0.134	0.638	-0.045
42	0.150	0.539	0.069
43	0.119	0.632	0.111
44	0.187	0.583	0.049
45	0.153	0.638	0.107
46	0.171	0.647	0.094
47	0.059	0.604	0.036
48	0.111	0.729	-0.005
49	0.126	0.661	0.116
50	0.036	0.527	0.056
51	0.106	0.686	0.087
52	0.101	0.580	0.118
53	0.150	0.652	-0.011
54	0.090	0.585	0.149
55	0.137	0.707	0.011
56	0.108	0.712	0.070
57	0.165	0.586	0.188
58	IE	IE	IE
59	0.178	0.653	-0.085
60	0.076	0.629	0.094
61	0.117	0.662	0.145

Note: IE=item eliminated.

Table 7: Factor loadings of the 2-factor model (41 items).

Item	Factor 1	Factor 2
1	0.826	0.124
2	0.815	0.172
3	0.563	0.154
4	0.800	0.076
5	0.865	0.102
6	0.873	0.150
7	0.758	0.135
8	0.815	0.093
9	0.876	0.125
10	0.783	0.209
11	IE	IE
12	0.827	0.230
13	0.838	0.200
14	0.795	0.236
15	0.756	0.166
16	0.778	0.147
17	0.799	0.115
18	IE	IE
19	IE	IE
20	IE	IE
21	IE	IE
22	IE	IE
23	IE	IE
24	IE	IE
25	IE	IE
26	IE	IE
27	0.292	0.238
28	0.202	0.267
29	0.249	0.228
30	0.398	0.250
31	0.218	0.235
32	IE	IE
33	IE	IE
34	IE	IE
35	IE	IE
36	IE	IE
37	IE	IE
38	IE	IE

39	IE	IE
40	IE	IE
41	0.124	0.617
42	0.158	0.540
43	0.133	0.639
44	0.191	0.578
45	0.167	0.644
46	0.183	0.650
47	0.063	0.600
48	0.107	0.714
49	0.141	0.669
50	0.043	0.529
51	0.117	0.689
52	0.117	0.590
53	0.144	0.636
54	0.111	0.600
55	0.135	0.694
56	0.116	0.711
57	0.192	0.606
58	IE	IE
59	0.161	0.622
60	0.088	0.635
61	0.137	0.675

Note: IE=item eliminated.

Appendix

Appendix 1: Initial RBF instrument.

	Item no.	Question	Response				
Psychological	1	How often were you frustrated?	0	1	2	3	4
	2	How often did you feel defenseless?	0	1	2	3	4
	3	How often did you feel apathetic?	0	1	2	3	4
	4	How often did that incident make you more aware of racism?	0	1	2	3	4
	5	How often did you become irritable?	0	1	2	3	4
	6	How often did your mood dramatically change?	0	1	2	3	4
	7	How often did you feel in shock?	0	1	2	3	4
	8	How often did you feel disappointed?	0	1	2	3	4
	9	How often were you agitated?	0	1	2	3	4
	10	How often did you experience constant worrying?	0	1	2	3	4
	11	How often did the experience make you feel forgetful?	0	1	2	3	4
	12	How often did you feel helpless?	0	1	2	3	4
	13	How often did it effect your concentration?	0	1	2	3	4
	14	How often did you feel hopeless?	0	1	2	3	4
	15	How often did you feel threatened?	0	1	2	3	4
	16	How often did you experience disbelief?	0	1	2	3	4
	17	How often did you feel on guard?	0	1	2	3	4
Behavioral	18	Try to cope, but continue to experience stress?	0	1	2	3	4
	19	Feel that because of your race, people believed that you had less ability.	0	1	2	3	4
	20	Turn to your spirituality and/or religious organization?	0	1	2	3	4
	21	Experience a loss of appetite?	0	1	2	3	4
	22	Become impatient?	0	1	2	3	4
	23	Argue with someone?	0	1	2	3	4
	24	Ate more or less?	0	1	2	3	4
	25	Slept too much or too little?	0	1	2	3	4
	26	Procrastinate?	0	1	2	3	4
	27	Using drugs to relax?	0	1	2	3	4
	28	Using prescription drugs to relax?	0	1	2	3	4
	29	Using non-prescription drugs to relax?	0	1	2	3	4
	30	Using alcohol to relax?	0	1	2	3	4
	31	Using cigarettes to relax?	0	1	2	3	4
	32	Isolate yourself from others?	0	1	2	3	4
	33	Feel that you performed better than you thought you would on assignments	0	1	2	3	4
	34	Exhibited nervous habits (e.g. nail biting, pacing, excessive sweating)	0	1	2	3	4
	35	Neglect your responsibilities?	0	1	2	3	4

	36	Feel that because of your race, faculty expected you to do poorly.	0	1	2	3	4
	37	Allow your school performance to be negatively impacted?	0	1	2	3	4
	38	Allow your job performance to be negatively impacted?	0	1	2	3	4
	39	Allow your family relationships to be negatively impacted?	0	1	2	3	4
	40	Feel that you did not perform as well as you could have on tests or assignments	0	1	2	3	4
Physiological	41	Headaches?	0	1	2	3	4
	42	Grinding your teeth?	0	1	2	3	4
	43	Chest pains?	0	1	2	3	4
	44	Clench your jaws?	0	1	2	3	4
	45	Shortness of breath?	0	1	2	3	4
	46	Racing heart?	0	1	2	3	4
	47	Frequent colds?	0	1	2	3	4
	48	Muscle aches?	0	1	2	3	4
	49	Indigestion?	0	1	2	3	4
	50	Gas?	0	1	2	3	4
	51	Frequently ill?	0	1	2	3	4
	52	Constipation or diarrhea?	0	1	2	3	4
	53	Back pains?	0	1	2	3	4
	54	Increased perspiration?	0	1	2	3	4
	55	Sleep disturbances?	0	1	2	3	4
	56	Pains in joints?	0	1	2	3	4
	57	Intestinal problems?	0	1	2	3	4
58	Hives or rashes?	0	1	2	3	4	
59	Feel fatigued?	0	1	2	3	4	
60	Insomnia?	0	1	2	3	4	
61	Other sicknesses?	0	1	2	3	4	

Note: Responses are 0 = Never; 1 = Almost Never; 2 = Sometimes; 3 = Fairly Often; 4 = Very Often.

Appendix 2: Final RBF instrument.

	Item no.	Question	Response				
Psychological	1	How often were you frustrated?	0	1	2	3	4
	2	How often did you feel defenseless?	0	1	2	3	4
	3	How often did you feel apathetic?	0	1	2	3	4
	4	How often did that incident make you more aware of racism?	0	1	2	3	4
	5	How often did you become irritable?	0	1	2	3	4
	6	How often did your mood dramatically change?	0	1	2	3	4
	7	How often did you feel in shock?	0	1	2	3	4
	8	How often did you feel disappointed?	0	1	2	3	4
	9	How often were you agitated?	0	1	2	3	4
	10	How often did you experience constant worrying?	0	1	2	3	4
	11	How often did you feel helpless?	0	1	2	3	4
	12	How often did it effect your concentration?	0	1	2	3	4
	13	How often did you feel hopeless?	0	1	2	3	4
	14	How often did you feel threatened?	0	1	2	3	4
	15	How often did you experience disbelief?	0	1	2	3	4
	16	How often did you feel on guard?	0	1	2	3	4
Behavioral	17	Using drugs to relax?	0	1	2	3	4
	18	Using prescription drugs to relax?	0	1	2	3	4
	19	Using non-prescription drugs to relax?	0	1	2	3	4
	20	Using alcohol to relax?	0	1	2	3	4
	21	Using cigarettes to relax?	0	1	2	3	4
Physiological	22	Headaches?	0	1	2	3	4
	23	Grinding your teeth?	0	1	2	3	4
	24	Chest pains?	0	1	2	3	4
	25	Clench your jaws?	0	1	2	3	4
	26	Shortness of breath?	0	1	2	3	4
	27	Racing heart?	0	1	2	3	4
	28	Frequent colds?	0	1	2	3	4
	29	Muscle aches?	0	1	2	3	4
	30	Indigestion?	0	1	2	3	4
	31	Gas?	0	1	2	3	4
	32	Frequently ill?	0	1	2	3	4
	33	Constipation or diarrhea?	0	1	2	3	4
	34	Back pains?	0	1	2	3	4
	35	Increased perspiration?	0	1	2	3	4
	36	Sleep disturbances?	0	1	2	3	4
	37	Pains in joints?	0	1	2	3	4
	38	Intestinal problems?	0	1	2	3	4
	39	Feel fatigued?	0	1	2	3	4

	40	Insomnia?	0	1	2	3	4
	41	Other sicknesses?	0	1	2	3	4

Note: Responses are 0 = Never; 1 = Almost Never; 2 = Sometimes; 3 = Fairly Often; 4 = Very Often.

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