ABSTRACT
        Many cross-cultural studies have been criticized for
imposing instruments on peoples of other cultures as if the
constructed measure were universal. This study attempts to establish
a cross-cultural equivalence of measurement and construct validity in
an examination of the functions of social networks in Zimbabwean,
Chinese, and American societies. A sample of adolescents from each
country completed assessments describing their perceptions of their
familial and extra-familial social networks. The dimensions
underlying adolescents' perceptions of their parents were quite
similar not only when comparing mothers and fathers within a culture,
but also when comparing the roles of parents across the three
cultures. African mothers and fathers were least similar to a
pan-cultural model, while Chinese and American parents were
considered to be closer to the model. Other parental similarities and
differences within a given culture or between cultures were also
found. (MDM)

Factorial Congruence of Adolescent Perceptions of Social Networks Across Three Cultures

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Abstract

Many cross-cultural studies to date have been criticized for imposing instruments on peoples of other cultures as if the constructed measured were universal. Procrustes transformations, the popular method of establishing factorial equivalence, have been criticized by Hurley and Cattell (1962) because, through the possible misuse of the procedures, one can perform "the brutal feat of making almost any data fit almost any hypothesis!". An alternative procedure, described by Wrigley and Neuhaus (1955), is illustrated. This provides an index roughly resembling a correlation coefficient to measure the degree of factorial similarity when two or more different samples are independently assessed via a single set of variables. African, Chinese, and American adolescents completed assessments describing their perceptions of their familial and extra-familial social networks. Comparisons made between maternal and paternal factors at the Par-cultural level provided similarity indices ranging from .69 to .96, and cross-cultural comparisons conducted within parent type provided indices ranging from .41 to .94. Overall, four factors (reliable affection, discipline/control, intimacy, and companionship) were found to possess sufficient cross-cultural and cross-parent similarity.

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It has been established that social networks function to meet the adjustment needs of developing persons and are perceived by them as important sources of support (Furman & Buhrmester, 1985; DeRosier & Kupersmidt, 1991, Reid, Landesman, Treder & Jaccard, 1989). Tietjen (1989) further argues both that social networks function to promote competence within the culture, and that the social requirements of a culture influence how persons within the social networks function to accomplish this end. Unfortunately, many cross-cultural studies to date have imposed instruments developed and standardized in Western cultures on samples of people from other cultures, and have employed between groups analyses in a search of cross-cultural differences. Research of this type has been labeled by Triandis (1972) as "pseudoetic", rather than "etic" (employing truly universal concepts or categories), in the sense that it imposes the "emic" (culture-specific) categories, variables, concepts, or constructs derived from past research in one culture (Western) on the members of another culture as if these categories and constructs were universal. Cross-cultural equivalence of measurement and construct validity must be established before any attempt to interpret cross-cultural contrasts is made. The purpose of this presentation is to illustrate the use of this procedure in the process of establishing cross-cultural measurement equivalence.

Sample and Procedure

Our sample consisted of adolescents, 13 and 15 years of age, living in an urban area with both parents and a sibling. Subjects from the Shona tribe in Zimbabwe, the Nanjing province of China, and a midwestern metropolitan area in the USA were assessed. The Network of Relationships Inventory (NRI) developed by Furman & Buhrmester (1985) was used to compare the relationships of the subject with the members of his/her social network. The NRI provided ten scores describing various aspects of the interpersonal relationship (e.g., reliable alliance, affection, instrumental help, intimacy, etc.). These conceptually derived factors are based on Weiss's (1974) theory of social provision within relationships, and are assumed to be non-orthogonal (Buhrmester, personal communication, 1992).

A detailed description of the procedures to obtain these data is found in Harrison, Stewart, Wang, Myambo, Chen and Chao (1992). The subjects' descriptions of their mothers and fathers via the NRI constituted the data sets to be described in this report. Separate analyses were conducted with each parent being considered the target. Analyses were conducted with the overall or Pan-cultural data set (N = 258 mothers and 246 fathers), the African subset (N = 98 mothers and 92 fathers), the Chinese subset (N = 107 mothers and 104 fathers), and the American subset (N = 53 mothers and 50 fathers).

Computation Procedures for the
Degree of Factorial Similarity

One method of establishing such equivalence is to conduct a factor analysis of the test in question and assess the similarity between the factor structure of the data drawn from the two cultures. This approach requires both that the factor loadings from the original standardization sample, and that some method of quantifying factorial similarity be available. A group of methods, collectively referred to as Procrustes transformations, have often been utilized to establish the extent to which two factors are related to one another. It is important to note that the term Hurley and Cattell (1962) attached to these techniques refers to the Procrustes, the evil character in Greek mythology who made all of his victims literally fit his bed by stretching those who were too short and cutting down those who were too tall. Indeed, Hurley and Cattell described the procedure as one that "makes almost any data fit almost any hypothesis" (p. 206). Such a description does little to encourage confidence in this being an advisable method for establishing cross-cultural congruence.

An earlier alternative had been provided by Wrigley and Neuhaus (1955) who described an index roughly resembling a correlation coefficient to measure the factorial similarity for factors derived from fixed variables measured on different samples.

The simple expedient of utilizing an index roughly resembling a coefficient of correlation has been used by several investigators to compare the weights of a fixed set of variables on two factors presumed to be identical, or at least, suspected to have a high degree of relationship. Wrigley and Neuhaus (1955) presented the following formula for measuring the degree of factorial similarity:

$$\varphi_{pq} = \frac{\sum\limits_{j=1}^{n} a_{jp} \, b_{jq}}{\sqrt{\left(\sum\limits_{j=1}^{n} a_{jp}^2\right)\left(\sum\limits_{j=1}^{n} b_{jq}^2\right)}}$$

Where 'a' and 'b' represent the loadings of the j variables obtained from two different samples designated as 'p' and 'q'. Therefore, the numerator is the sum of the product of the factor loadings from the two solutions being compared, and the denominator is the square root of the product of the sum of the squared factor loadings.

Results

Preliminary data analyses indicated that the underlying factors were significantly correlated, thereby leading us to conduct quartermax oblique rotations in deriving the final solutions. The number of factors derived was limited initially to the number of eigenvalues greater than 1.00, and a set of scree plots were derived to determine the optimal number of factors to be derived both across cultures and across targets (mothers vs. fathers). Six-factor solutions were derived (See Figures 1 and 2) and the congruence of the factors were assessed across cultures for each parent as well as between parents within each of the four cultural groups (See Table 1).

Four of the six factors were consistently found both across cultures and between targets with mean coefficients of factorial congruence ranging between .62 and .91. These four factors were provisionally labeled reliable affection, discipline/control, intimacy, and companionship. Reliable affection referred to providing the developing person with a sense of permanence and continuity in affection, respect, admiration, and a feeling that one was a worthwhile object of love. Discipline/control referred to providing the developing person with corrections for personal actions and clues for acceptable behavior. Intimacy referred to providing a sense of emotional closeness with another person so that you could open up and talk about all of your secrets, thoughts and feelings. Companionship referred to someone with whom you could play, have fun, and spend free time doing different things.

At the Pan-cultural level, the four factors derived for mothers and fathers appeared to be relatively similar (r values range from .71 to .96). However, when parental comparisons were made within cultures, a number of weaknesses appeared. Specifically, the discipline/control factors for African mothers and fathers were not at all similar (r = .17), and, overall, the factors derived for the African fathers did not resemble the Pan-cultural model nearly as well as those obtained for their Chinese and American counterparts.

Conclusions

The dimensions underlying adolescents' perceptions of their parents were quite similar not only when comparing mothers and fathers within a culture, but also when comparing the roles of the parents across the three cultures. Parental similarities and differences within a given culture or between cultures might be summarized in the following manner:

Mothers Across the Cultures:

- mothers in all three cultures were highly similar to the Pan-cultural model on reliable alliance.
- African mothers were least like the Pan-cultural model on discipline/control, and most similar on reliable affection; they were perceived as loving and as someone you could argue with over discipline issues; their offspring were happier and more satisfied with the nature of the relationship than were the other two groups.
- Chinese mothers were perceived as most similar to the Pan-cultural model on intimacy and discipline/control and least similar on companionship; they were perceived as quarrelsome companions more so than the other mothers.
- American mothers were most similar to the Pan-cultural model on reliable affection and least on discipline/control; they were perceived most as teaching as they disciplined.

Fathers Across the Cultures:

- African fathers were least similar to the Pan-cultural model on each of the four dimensions; they were perceived as providing a reliable affection to their offspring; they were loving, helpful, and willing to listen and spend free time with their offspring; they differed from the fathers in the other two cultures on discipline/control; they were perceived as disciplinarians in incidences of disobedience, yet African youngsters were sure the relationship would endure; intimacy was such that the youngster was permitted to get upset, mad, or argumentative with the father whereas this freedom was not perceived by the Chinese or American adolescents.
- Chinese fathers were perceived as the most similar to the Pan-cultural model of all parents surveyed; the Chinese fathers were highly similar on reliable affection and intimacy, and only somewhat less similar on discipline/control; Chinese fathers were perceived as having a disciplining style that emphasized intimacy.
- American fathers were perceived as similar to the Pan-cultural model on the qualities of reliable affection, intimacy, and companionship, and somewhat less similar on discipline/control.

Comparisons of Mothers and Fathers Within a Culture:

- African mothers and fathers were perceived as less similar to one another on all of the qualities; the affection of African mothers were perceived as involving more approval and enhancement than that of fathers, who were perceived as higher in instrumental help; mothers' discipline style was perceived as more conflict-laden than that of fathers; mothers were perceived as more loving and affectionate, whereas fathers were perceived as someone who was close to you but who was also more controlling; companionship with African mothers involved a sense of helpfulness, while companionship with fathers involved mutual activities.

- Chinese mothers and fathers were perceived in a highly similar manner on each of the four dimensions; one exception noted was that quarrelsomeness appeared to be more characteristic of the Chinese mothers than fathers.

- the dimensions underlying the descriptions of

American mothers and fathers were quite similar in
each of the domains except perhaps companionship,
where maternal companionship seemed to be flavored
with intimacy while paternal companionship was
characterized by mutual activities.

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Table 1

Indices of Factor Congruence Between Parents at Pancultural Level and Between Cultures Within Each Parent Type

Pan-cultural	African	Chinese	American	Means
Reliable Affection				
[M1 - F1]	M1 r = .92	M1 r = .88	M1 r = .94	r = .91
r = .93	F1 r = .66	F1 r = .91	F1 r = .89	r = .81
	(M1-F1) r = .66	(M1-F1) r = .95	(M1-F1) r = .81	r = .81
Discipline/Control				
[M2 - F3]	M5 r = .64	M4 r = .91	M3 r = .75	r = .78
r = .96	F4 r = .49	F4 r = .74	F5 r = .73	r = .63
	(M5-F4) r = .17	(M4-F4) r = .80	(M1-F1) r = .90	r = .62
Intimacy				
[M3 - F4]	M2 r = .77	M2 r = .92	M2 r = .88	r = .85
r = .93	F2 r = .55	F2 r = .96	F4 r = .89	r = .79
	(M2-F2) r = .23	(M2-F2) r = .94	(M2-F4) r = .89	r = .69
Companionship				
[M4 - F2]	M3 r = .72	M5 r = .59	M4 r = .76	r = .67
r = .71	F1 r = .69	F3 r = .77	F3 r = .80	r = .75
	(M3-F1) r = .57	(M5-F3) r = .96	(M4-F3) r = .65	r = .73

Note: Codes refer to factor number within solution, e.g., M1 is first factor when mother is target. Pan-cultural column is overall comparison of mothers and fathers; figures in other columns represent comparisons of mothers and fathers with their Pan-cultural counterparts, and then comparisons of parents within the given culture.

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PAN-CULTURAL SOLUTION, N= 258

FACTOR #1
AF29 -- strong affection for you
ST26 -- how good is relationship
AF18 -- really care about you
RA33 -- you sure relationship will last
RA11 -- relationship will last
AF7 -- like or love you
EW31 -- like/approve of things you do
ST15 -- happy with relationship
ST4 -- satisfied with relationship
EW9 -- you are admired/respected
EW20 -- treat you like you're good
IH25 -- help you when you need

FACTOR #2
CF13 -- disagree and quarrel
DS19 -- discipline when disobey
DS8 -- punish you
CF24 -- argue with each other
DS30 -- scold you

FACTOR #3
IN16 -- you share secrets
IN27 -- you talk about things
IN5 -- you tell everything

AFRICAN SOLUTION, N= 98

FACTOR #1
ST26 -- how good is relationship
AF29 -- strong affection for you
AF18 -- really care about you
IH25 -- help you when you need
RA33 -- you sure relationship will last
EW31 -- like/approve of things you do
EW20 -- treat you like you're good

FACTOR #2
IN16 -- you share secrets
IN27 -- you talk about things
CF24 -- argue with each other
CF2 -- you get upset/mad

FACTOR #3
ST4 -- satisfied with relationship
CP12 -- you play/have fun
DS19 -- discipline when disobey
CP1 -- you spend free time
AF7 -- like or love you
DS8 -- punish you
ST15 -- happy with relationship

CHINESE SOLUTION, N= 107

FACTOR #1
RA11 -- relationship will last
RA33 -- you sure relationship will last
RA22 -- relationship survive fights
AF18 -- really care about you
AF7 -- like or love you
AF29 -- strong affection for you
ST15 -- happy with relationship
ST4 -- satisfied with relationship
IH25 -- help you when you need

FACTOR #2
IN16 -- you share secrets
IN27 -- you talk about things
IN5 -- you tell everything
EW31 -- like/approve of things you do
IH14 -- help you figure out/fix
CP23 -- you go place/do things

FACTOR #3
CP1 -- you spend free time
IH3 -- teach you to do things
CF2 -- you get upset/mad
CP12 -- you play/have fun
ST26 -- how good is relationship
EW9 -- you are admired/respected

AMERICAN SOLUTION, N= 53

FACTOR #1
AF29 -- strong affection for you
AF18 -- really care about you
AF7 -- like or love you
RA33 -- you sure relationship will last
RA11 -- relationship will last
ST26 -- how good is relationship
ST15 -- happy with relationship
EW31 -- like/approve of things you do
ST4 -- satisfied with relationship
EW9 -- you are admired/respected
EW20 -- treat you like you're good
RA22 -- relationship survive fights

FACTOR #2
IN5 -- you tell everything
IN16 -- you share secrets
IN27 -- you talk about things
IH3 -- teach you to do things

FACTOR #3
DS8 -- punish you
CF2 -- you get upset/mad
CF24 -- argue with each other
CF13 -- disagree and quarrel
DS19 -- discipline when disobey

Note: Letters and numbers refer to the original scales and item numbers as found in the NRI: RA = Reliable Alliance, EW = Enhancement (

CTOR #4
12 -- you play/have fun
23 -- you go place/do things
1 -- you spend free time

FACTOR #5
RA22 -- relationship survive fights
CF2 -- you get upset/mad

FACTOR #6
IH14 -- help you figure out/fix
IH3 -- teach you to do things

CTOR #4
5 -- you tell everything
3 -- teach you to do things
14 -- help you figure out/fix
5 -- you help with things

FACTOR #5
CF13 -- disagree and quarrel
EW9 -- you are admired/respected
DS30 -- scold you
RA11 -- relationship will last

FACTOR #6
CP23 -- you go place/do things
RA22 -- relationship survive fights

CTOR #4
8 -- punish you
19 -- discipline when disobey
24 -- argue with each other
13 -- disagree and quarrel

FACTOR #5
EW20 -- treat you like you're good
IH6 -- you help with things

FACTOR #6
DS30 -- scold you

CTOR #4
23 -- you go place/do things
25 -- help you when you need
12 -- you play/have fun
1 -- you spend free time

FACTOR #5
IH14 -- help you figure out/fix
IH6 -- you help with things

FACTOR #6
DS30 -- scold you

Vorth, AF = Affection, CP = Companionship, IN = Intimacy, IH = Instrumental Help, ST = Satisfaction, DS = Discipline, CF = Conflict.

PAN-CULTURAL SOLUTION, N= 246

FACTOR #1	FACTOR #2	FACTOR #3
EW9 -- you are admired/respected	CP23 -- you go place/do things	DS19 -- discipline when disobey
ST4 -- satisfied with relationship	IH25 -- help you when you need	DS8 -- punish you
ST15 -- happy with relationship	CP12 -- you play/have fun	CF24 -- argue with each other
AF18 -- really care about you	IH14 -- help you figure out/fix	CF13 -- disagree and quarrel
RA11 -- relationship will last	AF7 -- like or love you	DS30 -- scold you
RA33 -- you sure relationship will last	IH3 -- teach you to do things	
ST26 -- how good is relationship	EW31 -- like/approve of things you do	
AF29 -- strong affection for you	EW20 -- treat you like you're good	

AFRICAN SOLUTION, N= 92

FACTOR #1	FACTOR #2	FACTOR #3
ST15 -- happy with relationship	DS19 -- discipline when disobey	CF2 -- you get upset/mad
IH14 -- help you figure out/fix	IN27 -- you talk about things	IH6 -- you help with things
AF7 -- like or love you	IH3 -- teach you to do things	DS30 -- scold you
AF18 -- really care about you	RA33 -- you sure relationship will last	DS8 -- punish you
IH25 -- help you when you need	EW31 -- like/approve of things you do	
CP1 -- you spend free time	EW20 -- treat you like you're good	
IN5 -- you tell everything		

CHINESE SOLUTION, N= 104

FACTOR #1	FACTOR #2	FACTOR #3
RA33 -- you sure relationship will last	IN16 -- you share secrets	EW20 -- treat you like you're good
RA11 -- relationship will last	IN27 -- you talk about things	IH6 -- you help with things
RA22 -- relationship survive fights	IN5 -- you tell everything	IH25 -- help you when you need
AF29 -- strong affection for you	CP23 -- you go place/do things	EW9 -- you are admired/respected
ST15 -- happy with relationship		IH14 -- help you figure out/fix
AF18 -- really care about you		

AMERICAN SOLUTION, N= 50

FACTOR #1	FACTOR #2	FACTOR #3
RA11 -- relationship will last	AF18 -- really care about you	IH14 -- help you figure out/fix
RA33 -- you sure relationship will last	AF7 -- like or love you	CP12 -- you play/have fun
RA22 -- relationship survive fights	AF29 -- strong affection for you	IH25 -- help you when you need
ST15 -- happy with relationship	EW9 -- you are admired/respected	DS19 -- discipline when disobey
ST26 -- how good is relationship		CP23 -- you go place/do things
ST4 -- satisfied with relationship		EW31 -- like/approve of things you do
EW20 -- treat you like you're good		

Note: Letters and numbers refer to the original scales and item numbers as found in the NRI: RA = Reliable Alliance, EW = Enhancem

FACTOR #4
IN27 -- you talk about things
IN16 -- you share secrets
IN5 -- you tell everything

FACTOR #5
CF2 -- you get upset/mad

FACTOR #6
RA22 -- relationship survive fights
CP1 -- you spend free time

FACTOR #4
CF24 -- argue with each other
AF29 -- strong affection for you

FACTOR #5
ST4 -- satisfied with relationship
CF13 -- disagree and quarrel
EW9 -- you are admired/respected

FACTOR #6
CP23 -- you go place/do things
ST26 -- how good is relationship
RA11 -- relationship will last
CP12 -- you play/have fun
IN16 -- you share secrets

FACTOR #4
DS19 -- discipline when disobey
DS8 -- punish you
DS30 -- scold you
EW31 -- like/approve of things you do

FACTOR #5
ST4 -- satisfied with relationship
ST26 -- how good is relationship
CF2 -- you get upset/mad
IH3 -- teach you to do things
CP1 -- you spend free time
CP12 -- you play/have fun
AF7 -- like or love you

FACTOR #6
CF13 -- disagree and quarrel
CF24 -- argue with each other

FACTOR #4
IN16 -- you share secrets
IN5 -- you tell everything
IN27 -- you talk about things
IH3 -- teach you to do things
CP1 -- you spend free time

FACTOR #5
CF13 -- disagree and quarrel
DS8 -- punish you
CF2 -- you get upset/mad
CF24 -- argue with each other

FACTOR #6
DS30 -- scold you
IH6 -- you help with things

of Worth, AF = Affection, CP = Companionship, IN = Intimacy, IH = Instrumental Help, ST = Satisfaction, DS = Discipline, CF = Conflict.

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