

# Multilevel family-related constructs as predictors of psychological outcomes: The case of family values

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# Multilevel models in Cross-Cultural Psychology

- In cross-cultural studies observations are not independent (individuals within cultures tend to be more similar).
- Therefore, in cross-cultural analyses observed differences are composed of two sources of variance, i.e., individual and country.
- A multilevel design has a nested hierarchical structure and assumes that there exist relationships between levels (e.g., Nezlek, 2008).
- Although cross-cultural designs are inherently multilevel in nature, their multiple structure is not always considered in the data analysis.

# Multilevel models in Cross-Cultural Psychology

Two types of **models** (Stanat & Lüdtke, 2008):

- Explore *comparability* (structural equivalence) of data from different cultures (e.g., Mylonas et al., 2008).
- Identify *predictors* of individual outcomes from both individual and country variables, or from their interaction.

Two types of **measures** (van de Vijver et al., 2008):

- *Intrinsic* data are directly used in their natural level of analysis (e.g., GDP → country; well-being → individual).
- *Derived* measures are collected at one level and used at another, after being (dis)aggregated (e.g., values as an individual and country concept).

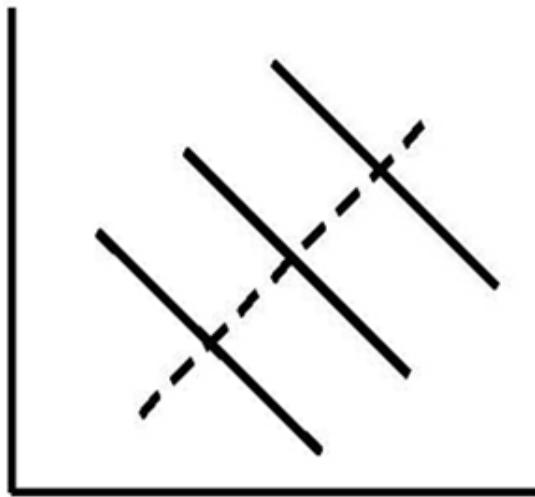
## Why HLM? Advantages of MRCM over OLS

- In hierarchically structured data, observations at L1 are not independent; this violates a fundamental assumption of OLS approach.
- MRCM considers the sampling error at different levels simultaneously (not the case in OLS). In addition, MRCM yields more accurate estimates than OLS because it takes into account the reliability of scores and the differences in sample sizes.
- Single-level techniques that ignore the hierarchical structure of data can provide misleading results since relationships at different levels of analyses are independent.

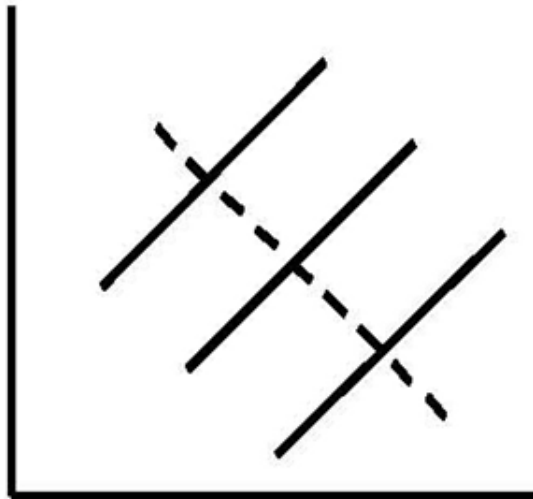
(Kreft & de Leeuw, 1998)

# Relationships at different levels of analysis are independent

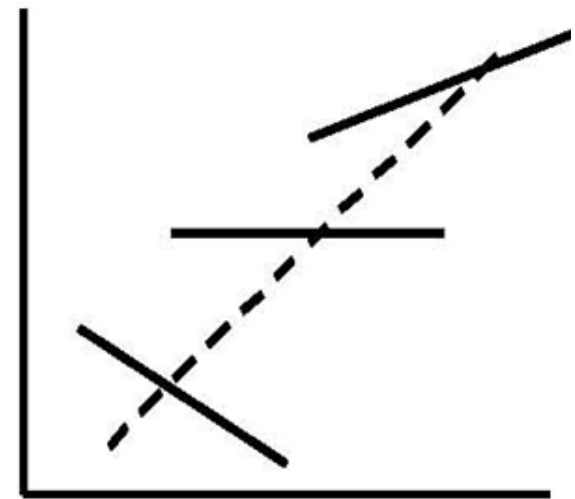
Negative within L1  
Positive between L2



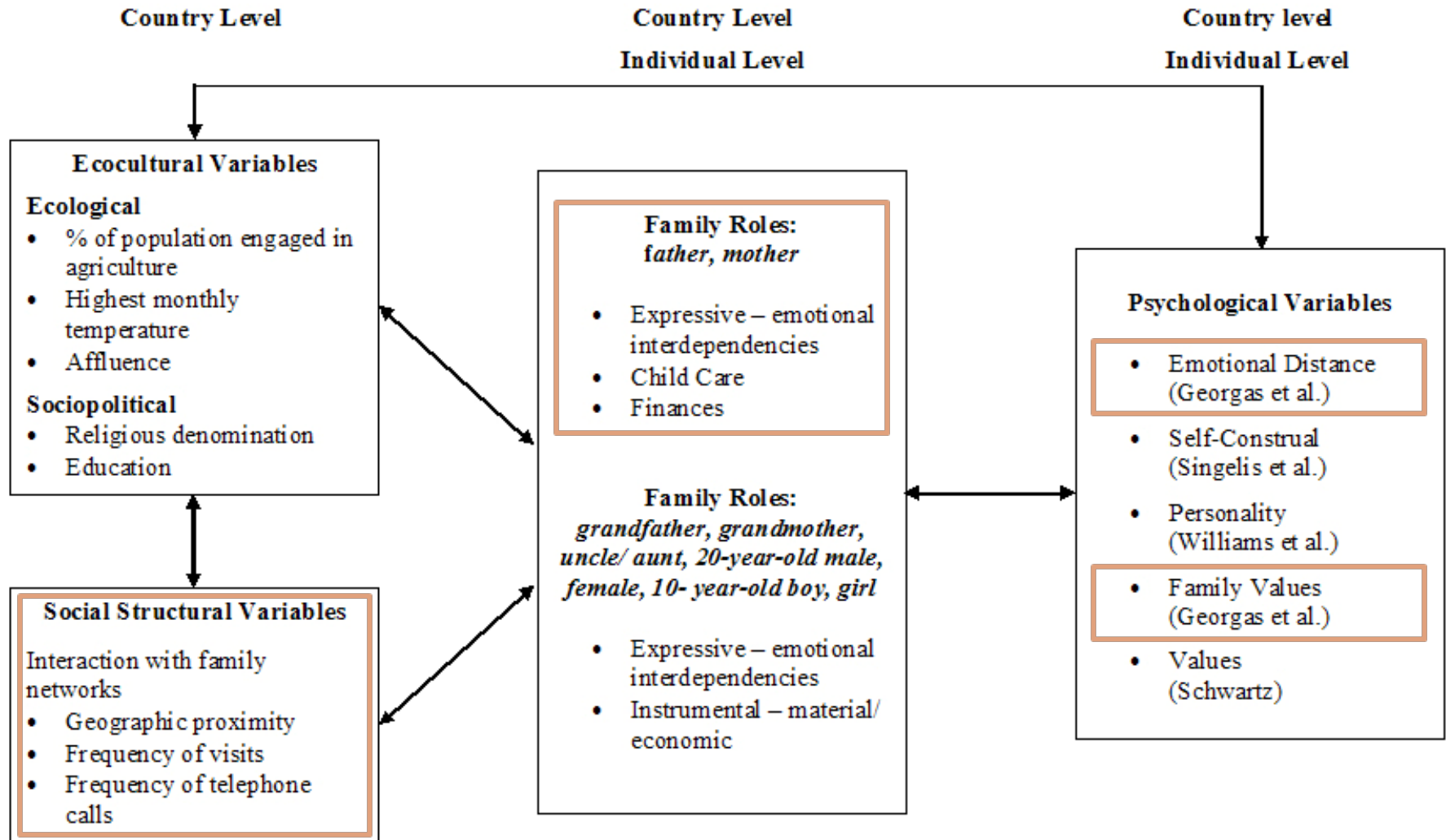
Positive within L1  
Negative between L2



Varying within L1  
Positive between L2



# Levels of analyses and variables employed in the Families Across Cultures study (Georgas et al., 2006)



## Questions of relevance

- To what extent family values can be predicted from family networks, family roles and emotional distance from family members, as individual and country-level constructs?
- Three types of possible contextual effects:
  - within-level (roughly as in OLS regression)
  - direct cross-level (e.g., what is the effect of a country-level predictor on family values after controlling for individual-level responses?)
  - cross-level interactions (i.e., does a country-level predictor modify the relationship between two individual-level variables?)
- ☞ Country measures of family networks, roles and emotional bonds derived from aggregated individual-level data.

# Participants

- The Families Across Cultures study (Georgas et al., 2006) extended
- Level 1 – 8,863 individuals  
(59.4% female; mean age=21.6 yrs, SD=4.1 yrs)
- Level 2 – 41 countries  
(Algeria, N=107; Argentina, N=82; Australia, N=180; Brazil, N=159; Bulgaria, N=195; Canada, N=215; Chile, N=207; China, N=476; Costa Rica, N=234; Croatia, N=209; Cyprus, N=132; France, N=97; Georgia, N=200; Germany, N=153; Ghana, N=70; Greece, N=350; Guatemala, N=203; Hong Kong, N=423; Hungary, N=205; India, N=220; Indonesia, N=239; Iran, N=189; Italy, N=209; Japan, N=185; Malaysia, N=310; Mexico, N=227; The Netherlands, N=165; Nigeria, N=337; Pakistan, N=450; Poland, N=200; Portugal, N=219; Saudi Arabia, N=198; South Africa, N=197; South Korea, N=199; Spain, N=111; Sudan, N=115; Switzerland, N=542; Turkey, N=211; Ukraine, N=65; United Kingdom, N=115; United States, N=263)



# Measures

- Family networks (Georgas et al., 1997):
  - Geographical proximity (6 items,  $\alpha=.79$ )
  - Frequency of visits (6 items,  $\alpha=.81$ )
  - Frequency of telephone calls (6 items,  $\alpha=.84$ )
- Family roles (Georgas et al., 2006):
  - Expressive (12 items,  $\alpha_{\text{MOTHER}}=.85$ ,  $\alpha_{\text{FATHER}}=.91$ )
  - Financial (6 items,  $\alpha_{\text{MOTHER}}=.70$ ,  $\alpha_{\text{FATHER}}=.81$ )
  - Child care (3 items,  $\alpha_{\text{MOTHER}}=.63$ ,  $\alpha_{\text{FATHER}}=.69$ )
- Emotional distance (Georgas et al., 2001) – reversed:
  - Nuclear family (3 items,  $\alpha=.60$ )
  - Extended family (3 items,  $\alpha=.72$ )
- Family values (Georgas, 1989, 1991):
  - Hierarchy (7 items,  $\alpha=.86$ )
  - Relationships with family and kin (7 items,  $\alpha=.78$ )

## Statistical analyses

- A series of hierarchical (two-level) regressions were performed using HLM v.6 (Raudenbush & Bryk, 2002).
- Criterion variables were each of the two factors of family values.
- Predictors included:
  - (a) each of the factors of family networks, family roles, and emotional bonds at the individual level (L1), and
  - (b) the aggregated score of the respective factors at the country level (L2).

## Example of HLM model specification

- Level-1 model:  $FV\_HI = \beta_0 + \beta_1(FR\_ME\_L1) + r$

Level-2 model:  $\beta_0 = \gamma_{00} + \gamma_{01}(FR\_ME\_L2) + u_0$

$$\beta_1 = \gamma_{10} + \gamma_{11}(FR\_ME\_L2) + u_1$$

FV\_HI: Family values regarding hierarchy

FR\_ME\_L1: Expressive family role of mother (individual scores)

FR\_ME\_L2: Expressive family role of mother (aggregated country scores)

- Questions of interest:

- Do family values re: hierarchy vary as a function of individual differences in the expressive role of mother? ( $\gamma_{10}$ )
- Do family values re: hierarchy differ as a function of country variation in the expressive role of mother? ( $\gamma_{01}$ )
- Does the relationship of family values re: hierarchy with the expressive role of mother at the individual level is modified by country differences in the respective role? ( $\gamma_{11}$ )

## Example of HLM6 output

The outcome variable is **FV\_HI\_L1**

Final estimation of fixed effects (with robust standard errors)

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Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
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For	INTRCPT1, B0				
INTRCPT2, G00	4.418	0.115	38.334	39	0.000
FR_ME_L2, <b>G01</b>	2.032	0.477	4.260	39	<b>0.000</b>
For FR_ME_L1 slope, B1					
INTRCPT2, <b>G10</b>	0.179	0.024	7.326	39	<b>0.000</b>
FR_ME_L2, <b>G11</b>	0.079	0.078	1.008	40	<b>0.320</b>

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Family values re: hierarchy (DV) are predicted by the expressive role of mother at both the individual and country levels. Cross-level interaction is non-significant, which indicates that the above L1 relationship is valid across L2 (countries).

# Multilevel contribution of family networks and emotional bonds in predicting family values re: hierarchy

	L1	L2	L1 x L2
Intercept	4.42***		
> Family networks: geography	0.04***	0.89***	n.s.
> Family networks: visits	0.03*	n.s.	n.s.
> Family networks: telephone	n.s.	n.s.	n.s.
> Bonds: nuclear family	0.10***	n.s.	n.s.
> Bonds: extended family	0.06***	n.s.	n.s.

\* p<.05; \*\* p<.01; \*\*\* p<.001

# Multilevel contribution of family roles of mother and father in predicting family values re: hierarchy

	L1	L2	L1 x L2
Intercept	4.42***		
> Mother role: expressive	0.18***	2.03***	n.s.
> Mother role: financial	n.s.	n.s.	n.s.
> Mother role: child care	0.04**	n.s.	n.s.
> Father role: expressive	0.22***	1.75***	n.s.
> Father role: financial	0.23***	1.32***	n.s.
> Father role: child care	0.08***	n.s.	n.s.

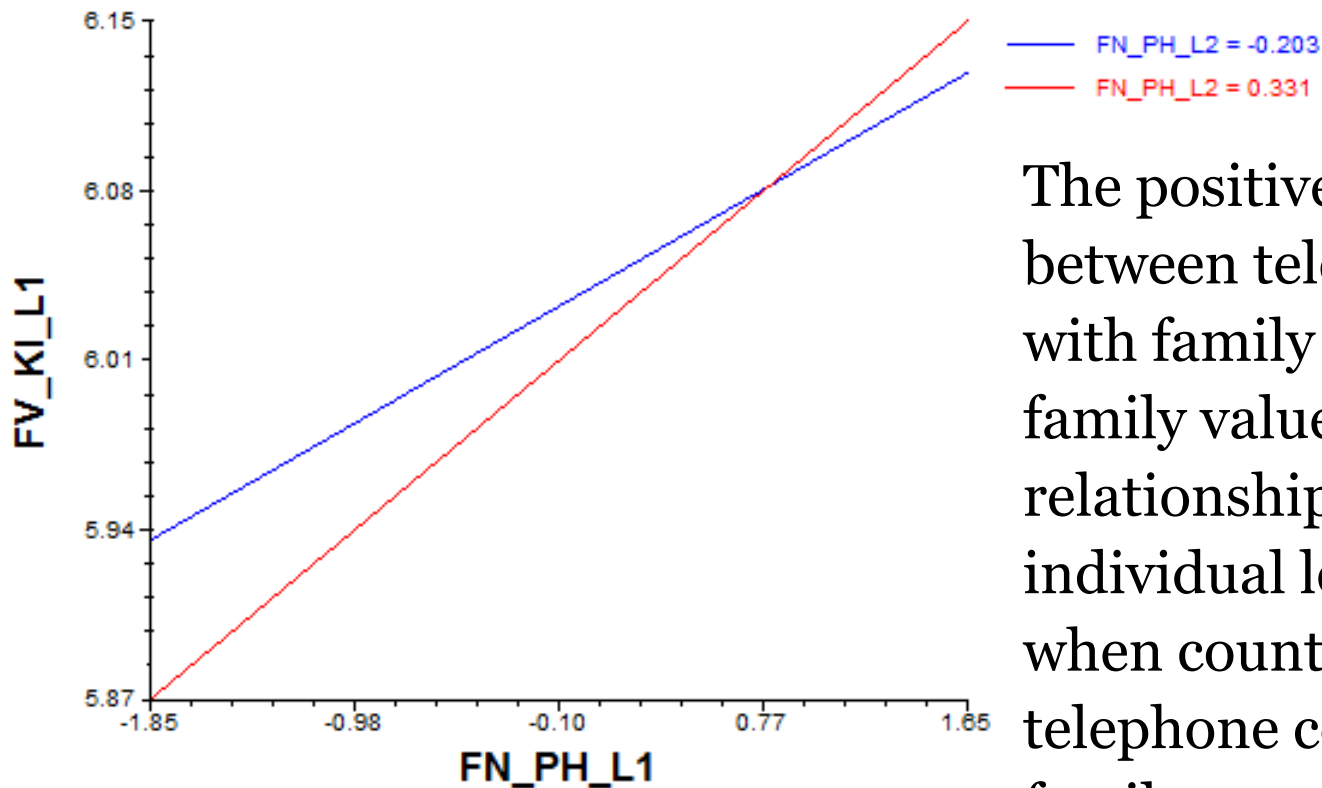
\* p<.05; \*\* p<.01; \*\*\* p<.001

# Multilevel contribution of family networks and emotional bonds in predicting family values re: relationships with kin

	L1	L2	L1 x L2
Intercept	6.03***	n.s.	n.s.
> Family networks: geography	0.03***	n.s.	n.s.
> Family networks: visits	0.06***	n.s.	n.s.
> Family networks: telephone	0.06***	n.s.	0.05**
> Bonds: nuclear family	0.18***	0.47**	n.s.
> Bonds: extended family	0.12***	n.s.	n.s.

\* p<.05; \*\* p<.01; \*\*\* p<.001

# Cross-level interaction of individual and country measures of telephone contact with family members in predicting family values re: relationships with kin



The positive association between telephone contact with family members and family values regarding relationships with kin at the individual level is stronger when country measures of telephone contact with family members are higher.

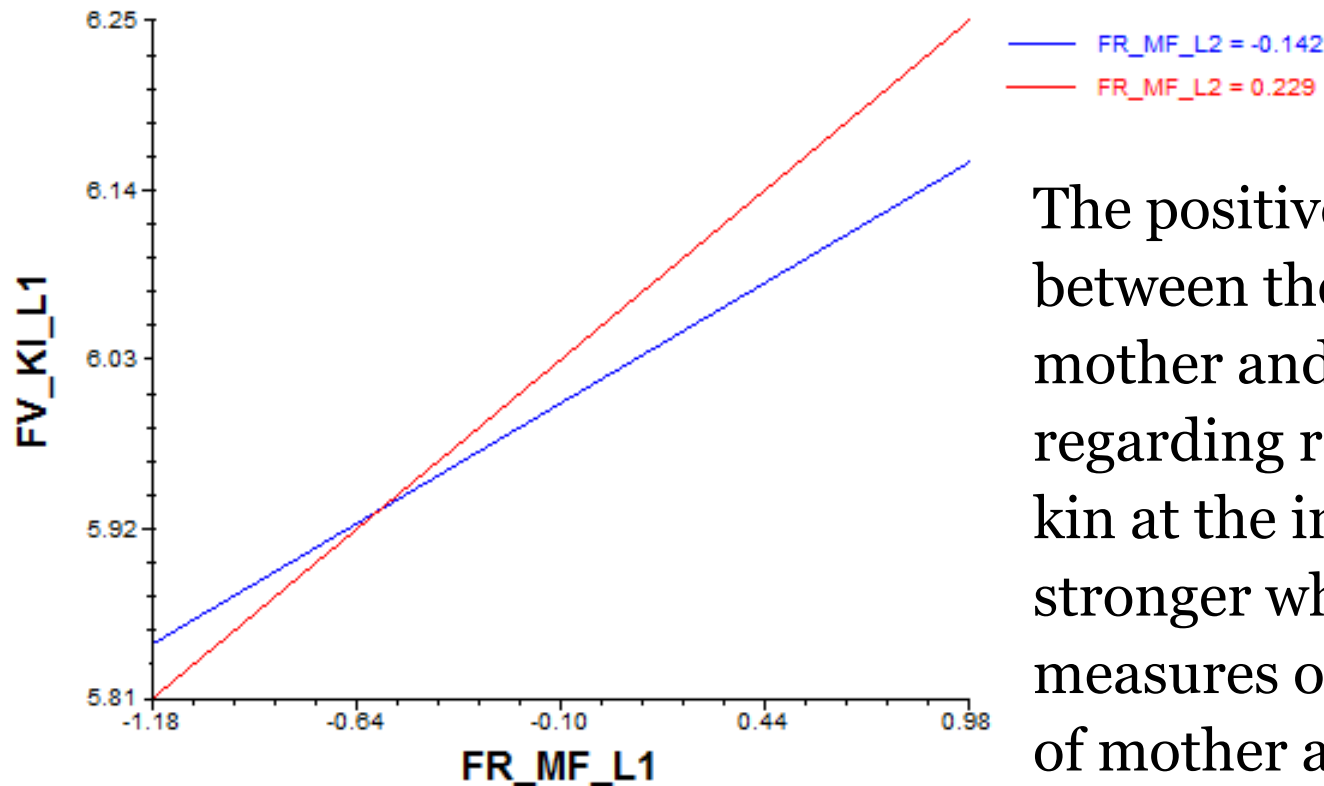


# Multilevel contribution of family roles of mother and father in predicting family values re: relationships with kin

	L1	L2	L1 x L2
Intercept	6.03***		
> Mother role: expressive	0.30***	0.94***	n.s.
> Mother role: financial	0.17***	n.s.	0.16***
> Mother role: child care	0.08***	n.s.	0.07**
> Father role: expressive	0.19***	0.57***	n.s.
> Father role: financial	0.14***	0.49**	n.s.
> Father role: child care	0.07***	0.40**	n.s.

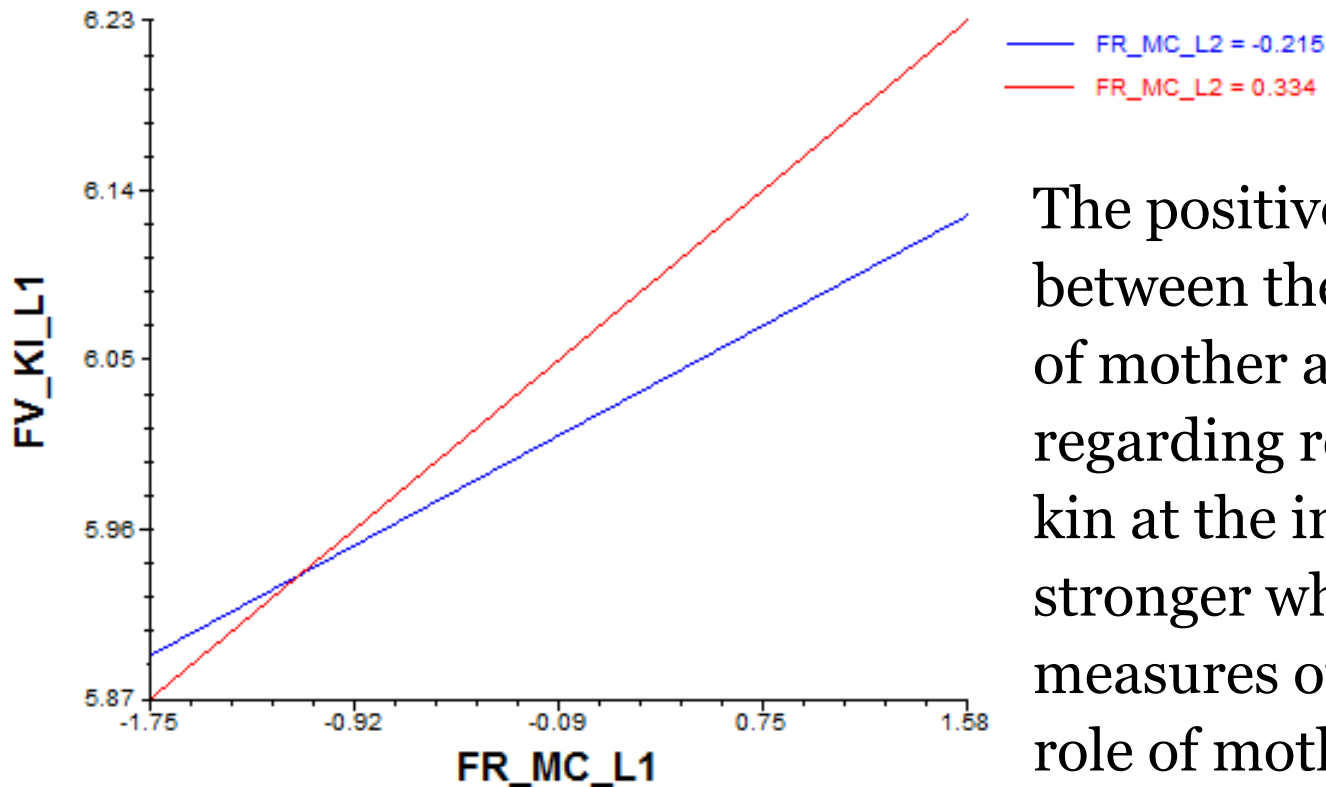
\* p<.05; \*\* p<.01; \*\*\* p<.001

# Cross-level interaction of individual and country measures of the financial role of mother in predicting family values re: relationships with kin



The positive association between the financial role of mother and family values regarding relationships with kin at the individual level is stronger when country measures of the financial role of mother are higher.

# Cross-level interaction of individual and country measures of the child caring role of mother in predicting family values re: relationships with kin



The positive association between the child care role of mother and family values regarding relationships with kin at the individual level is stronger when country measures of the child care role of mother are higher.

## Summary and conclusions

- Family networks, family roles and emotional bonds with family members contributed to the prediction of family values, esp. in what concerns relationships with kin, at the individual level (20 out of 22 tests significant).
- Moreover, country variation in the above concepts predicted family values after controlling for individual responses in 9 out of 22 cases; most of them referred to the associations between family roles of both mother and father with the dependent variables (7 out of 12 tests significant).
- Finally, cross-level interactions of individual by country-level predictors emerged in 3 out of 22 analyses.

## Summary and conclusions

- Individual-level effects were towards expected direction, in line with previous findings (Georgas et al., 2006).
- Country-level effects indicate that acceptance of traditional family values from the side of individuals is enhanced when other related family constructs, such as mother and father roles, are salient in the sociocultural context.
- In the cases where country-level measures were found to modify individual-level associations, these effects concerned the strength, but not the direction of relationships.
- The above may be due to an underlying socialization process leading in the internalization of social norms (e.g., Botempo et al., 1990; Miller, 1997).

## Strengths, weaknesses, and future directions

- Multilevel modeling offers an attractive and robust way to study the interplay between individuals and cultures. Even single-level associations are more accurately depicted in MRCM, compared to OLS alternatives (Nezlek, 2008).
- As any analysis, MRCM does have limitations (e.g., number of L2 units, groups-to-observations ratio, calculating effect sizes; see de Leeuw & Kreft, 1995).
- There is large potential in applying multilevel techniques in the Families Across Cultures data set in order to explore the effects of country indicators and their interactions with psychological variables, on the basis of hypotheses drawn from relevant theoretical frameworks.



*Thank you for your attention!*

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