

Interethnic Friendships under Ethnically Segregated Education Pathways

The Case of Malaysia

Hanson Chong

Economics, Trade and Regional Integration
Institute of Strategic & International Studies (ISIS) Malaysia

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Overview

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Homophily

- Social networks are characterised by homophily ([McPherson et al., 2001](#)).
- Homophily is the tendency for individuals to associate with others who are like themselves, e.g. sharing a common physical characteristics, socioeconomic background, values, interests.

Homophily and social cohesion

- Homophily in personal networks may perpetuate inequalities as economic opportunities and resources are concentrated and consolidated within a homogenous network of similar individuals (DiMaggio and Garip, 2012)
- This is especially pertinent in plural societies, where a population divided along ethnic lines coexist within a single political entity (Smith, 1971).
- Mediating ethnic relations by addressing disparities is a priority for policymakers in plural societies.

The Contact Effect

- Contact between different social groups under favourable conditions leads to reduced prejudice and increased acceptance of out-group members ([Allport, 1954](#)).
- There is evidence to suggest the Contact Hypothesis works ([Paluck et al., 2019](#); [Pettigrew and Tropp, 2006](#)).
- **However!** The interventions examined typically span less than a year, with outcomes measured immediately after the intervention.
- Outstanding question: Does prolonged and sustained interethnic contact improve interethnic relations?

Schools in plural societies as a contact intervention

- Schools are a locus for social interactions with the potential to change perceptions and social behaviour.
- National schools in plural societies provide a unique point of convergence in the life journeys of individuals from various backgrounds ([Selvadurai et al., 2015](#)).

The Malaysian context

- Malaysia is a plural society with three major ethnic groups:
 - Malay: 57.9%
 - Chinese: 22.6%
 - Indian: 6.6%
 - Others: 12.9% (indigenous people, East Malaysian ethnic groups, etc.)
- Ethnicity is a salient form of social classification in Malaysian society.

Ethnic segregation in education

- Ethnic segregation is present in the primary and secondary schools in Malaysia due to self-selection and affirmative action policies.
- At the primary level:
 - Most Chinese parents prefer to send their children to Chinese vernacular school (SJKC), while more than half of Indian parents prefer to send their children to Tamil vernacular school (SJKT) ([Raman and Sua, 2010](#)).
 - Islamic primary schools cater to the needs of the majority Muslim Malay community.
- At the secondary level:
 - Public school (Sekolah Jenis Kebangsaan, SMK) is the most popular due to its affordability and ubiquity.
 - Chinese independent schools (CIS) provide Chinese-medium education.
 - Several Bumiputera-exclusive institutions are established under the New Economic Policy (e.g. MARA Junior Science Colleges, Boarding Schools)

Typography of Malaysian schools

Primary Schools	
Sekolah Kebangsaan (SK)	Translated as “National Schools,” these are national primary schools. There is a total of 5,948 such schools throughout Malaysia, which is one school for roughly 1,345 households.
Sekolah Kebangsaan Jenis Cina (SJKC)	These are Chinese vernacular primary schools, where Mandarin is taught in addition to English and Malay. Science and mathematics are taught in Mandarin and English. There is a total of 1,305 SJKCs in Malaysia.
Sekolah Kebangsaan Jenis Tamil (SJKT)	These are Tamil vernacular primary schools, where the Tamil language is taught in addition to English and Malay. Science and mathematics are taught in English and the Tamil language. There is a total of 528 SJKTs in Malaysia.
Sekolah Agama	Translated as “Religious Schools,” these are schools that incorporate Islamic teachings in the curriculum. They are established and administered by state religious authorities rather than the Ministry of Education. At the primary level, these schools run parallel to the national school system, and many Muslims attend national school in the morning and Sekolah Agama in the afternoons or evenings.

Typography of Malaysian schools

Secondary Schools	
Sekolah Menengah Kebangsaan (SMK)	Translated as “National Secondary School,” these are the national schools where most Malaysians attend for secondary education. There is a total of 1,989 SMKs throughout Malaysia.
Chinese Independent School (CIS)	These are secondary education institutions that use Mandarin as the medium of language. They do not receive fundings from the Malaysian government and are self-funded or sustained by donations by the Chinese community (Siah <i>et al.</i> , 2015). Many were established by Chinese migrants during the 19 th and 20 th centuries. There is a total of 60 CIS today.
Sekolah Menengah Kebangsaan Agama (SMKA)	Translated as “Religious Secondary School,” these are established and administered by state religious authorities rather than the Ministry of Education, like Islamic schools at the primary level. There is a total of 61 SMKAs in Malaysia.
Maktab Rendah Sains MARA (MRSM)	Translated as “MARAs Science Junior College,” these are special boarding schools managed by Majlis Amanah Rakyat (MRSMA, or translated as “People’s Trust Council”), which is a government agency formed for the purposes of Bumiputera empowerment. MRSMA implements a 90 percent Bumiputera enrolment quota, and its aim is to accelerate the acquisition of science and technology subjects among the Bumiputera population.
Sekolah Berasrama Penuh (SBP)	Translated as “Full Boarding Schools,” these are selective secondary schools modelled after British boarding schools. SBPs were established through the Second Malaysia Plan (1975 - 1980) with the aim of providing quality science and technology education to Malaysian students with high potential.

Research Questions

- How does education pathway affect friendship formation later in life?
 - Does attending more diverse school types increase the diversity of friendships?
 - Does attending ethnic-exclusive institutions increase homophilic tendencies?

- Sample: 203 personal friendship networks of university students, who named a total of 2,182 friends.
- I administered a survey to collect information on respondents (egos) and their friends (alters).
- This allows me to explore how ego attributes (e.g. reported ethnicity, schooling background) correlate with the composition of their friendship networks.

Outcome of interest: Homophily

Homophily is operationalised as **the increase in the likelihood of forming a friendship with someone of the same ethnicity.**

Exponential Random Graph Model (ERGM)

- An ERGM models the probability of observing a network as a function of a vector of network statistics ([Hunter et al., 2008](#))

$$\Pr(Y = y) = \frac{\exp(\theta^T \delta(x, y))}{c(\theta)}$$

- $\delta(x, y)$ is a mapping function that computes sufficient statistics encompassing the change in the probability of observing the network in response to a change in an exogenous attribute x of a network actor while leaving the rest of the network unchanged
- θ^T is the coefficient of network statistics
- $c(\theta)$ normalises the probability to $(0, 1]$

Homophily in an ERGM

- The key network statistic of interest is ethnic homophily.
- In the ERGM framework, homophily is the increase in the log odds of observing a network in response to two actors being of the same ethnicity, as opposed to being of different ethnicities, holding the rest of the network constant.

Modelling changes in homophily

- We conduct moderation analysis of the ethnic homophily ERGM term.
- We analyse the change in the homophily term in response to a change in another attribute, i.e. the type of school an individual attended.
- Moderation analysis allows us to correlate schooling background with homophily.

Moderation Analysis

- To perform the moderation analysis, network statistics must first be interpreted as average marginal effects (AME) due to the problem of scaling ([Duxbury, 2023](#)).
 - ERGM estimates are denominated in log scale, while changes in the moderating variable are in levels.
 - When interacting these variables, estimates would be biased.
 - **However!** Predictions from ERGMs are not affected.
- Thus we can conduct the moderation analysis by using AME.

Obtaining the Average Marginal Effects (AME)

- The marginal effect can be calculated at each dyad by taking the partial derivative for the coefficient:

$$\text{marginal effect at } i = \theta \frac{\partial p_{ij}}{\partial x}$$

This is the increase in the probability of observing a tie p_{ij} in response to a one-unit increase in network attribute x at observation i .

- To incorporate marginal effects at all observations, we can average over all observations to obtain the AME:

$$AME_x = \theta \frac{1}{n} \sum \frac{dp_{ij}}{dx}$$

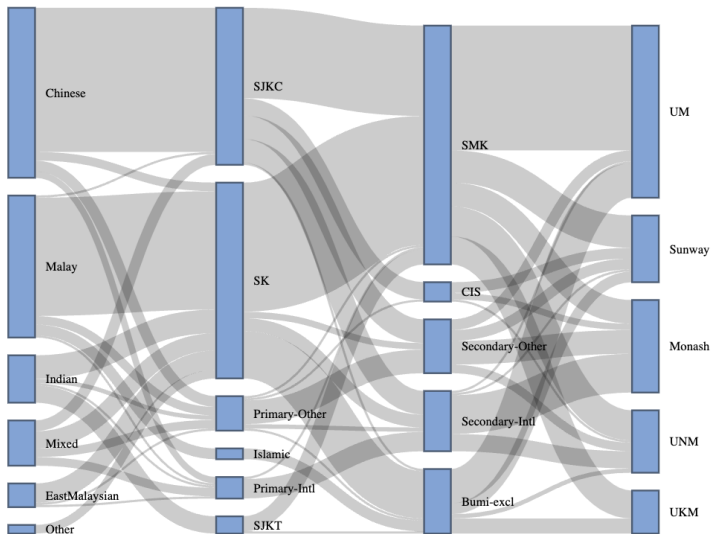
Moderation Analysis

- Moderation analysis involves the estimation of the change in the AME, ΔAME , of the ethnic homophily term when a moderating variable increases by 1, or, since our moderator is a binary variable, when it is 1 instead of 0:

$$\Delta AME = AME_x^{g=1} - AME_x^{g=0}$$

- $AME_x^{g=1}$ is the AME when the moderating variable g is 1 and $AME_x^{g=0}$ is the AME when the moderating variable g is 0.
- Asymptotic standard errors are obtained with the Taylor linearisation method, or the delta method (Raykov and Marcoulides, 2004).

Education pathways in the sample



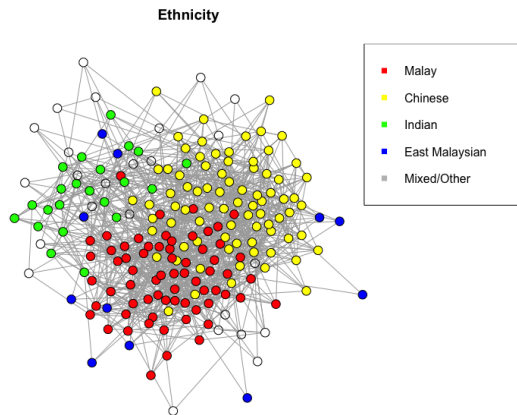
Key findings from ERGM analysis

- Ethnic homophily is statistically significant for all three major ethnic groups:
 - The odds of a friendship between two Malay students are $\exp(1.865) = 6.456$ times greater compared to friendship between a Malay and a non-Malay.
 - The odds of a friendship between two Chinese students are $\exp(1.828) = 6.221$ times greater compared to friendship between a Chinese and a non-Chinese.
 - The odds of a friendship between two Indian students are $\exp(2.436) = 11.427$ times greater compared to friendship between an Indian and a non-Indian.

Parameter	ERGM Model	AME
Ethnic Homophily		
Malay	1.865*** (0.107)	0.088*** (0.005)
Chinese	1.828*** (0.118)	0.087*** (0.006)
Indian	2.436*** (0.195)	0.115*** (0.009)
Mixed	0.821* (0.332)	0.039* (0.016)
Other	2.813*** (0.230)	0.133*** (0.011)

Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Other ERGM terms suppressed in this table, full table available in full text.

ERGM results



Key findings from moderation analysis

- Statistically significant downward moderating effect of attending SMK (public secondary school) across the Malay, Chinese and Indian ethnic homophily terms.
 - On average, the probability of a friendship tie increases by 10.3 percentage points if two individuals are Malay. This increase is moderated downwards to 9 percentage points.
 - On average, the probability of a friendship tie increases by 10.1 percentage points if two individuals are Chinese. This increase is moderated downwards to 8.7 percentage points.
 - On average, the probability of a friendship tie increases by 13.5 percentage points if two individuals are Indian. This increase is moderated downwards to 12.4 percentage points.
- No statistically significant upward moderating effect of ethnic-exclusive education institutions.

Moderation analysis

Moderating Variable	$AME_x^{g=0}$	$AME_x^{g=1}$	ΔAME_x	N
Main Effect: Malay Ethnic Homophily				
Primary: SK	0.080	0.089	0.009* (0.004)	55
Primary: SJKC	0.088	0.088	0.001 (0.004)	1
Primary: Islamic	0.088	0.091	0.003 (0.008)	5
Secondary: SMK	0.103	0.090	-0.014*** (0.003)	28
Secondary: Bumiputera-excl.	0.089	0.088	-0.001 (0.004)	27
Main Effect: Chinese Ethnic Homophily				
Primary: SK	0.078	0.088	0.009* (0.004)	4
Primary: SJKC	0.086	0.087	0.001 (0.004)	67
Secondary: SMK	0.101	0.087	-0.014*** (0.003)	44
Secondary: CIS	0.086	0.089	0.002 (0.005)	8
Main Effect: Indian Ethnic Homophily				
Primary: SK	0.114	0.127	0.013 (0.008)	11
Primary: SJKT	0.105	0.111	0.007 (0.004)	8
Secondary: SMK	0.135	0.124	-0.011** (0.004)	17
Secondary: Bumiputera-excl.	0.116	0.115	-0.001 (0.004)	1

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Delta standard errors for second difference in parentheses. Only combinations of ethnicity and primary/secondary with $N > 0$ are included.

Discussion of results

- Attending SMK (public secondary school) is seemingly effective in reducing homophilic tendencies. **Why?**
 - SMKs are the default option for most Malaysian. In 2021, 84% of Malaysian secondary-aged youths attended SMK.
 - SMKs have a more diverse ethnic composition than other secondary institutions.
 - Interethnic contact occurs in SMK. As such, SMK serve the role of a national school in the Malaysian context.

Conclusion

- There is **ethnic homophily** across the board.
- There is evidence to suggest that interethnic contact through national school reduce homophilic tendencies.
- Potential for policy interventions to promote interethnic contact between students of different school-types.
- Attending ethnic-exclusive institutions do not accentuate homophilic tendencies.
- It is possible to retain the unique features of the Malaysian education system while at the same time promote interethnic contact.

Thank you

Contact me at hanson@isis.org.my

Full paper available at <https://hansonchongzz.github.io/publication>