From Life Cycle to Life Course: The Age-Period-Cohort Model

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Lecture 1

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CENTER FOR STUDIES
IN DEMOGRAPHY AND ECOLOGY

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Life Course Perspective, Paradigm, Theory

The life course perspective, refers to a multidisciplinary paradigm for the study of people's lives, structural contexts, and social change. This approach encompasses ideas and observations from an array of disciplines, notably history, sociology, demography, developmental psychology, biology, and economics. In particular, it directs attention to the powerful connection between individual lives and the historical and socioeconomic context in which these lives unfold

Glen Elder, University of North Carolina
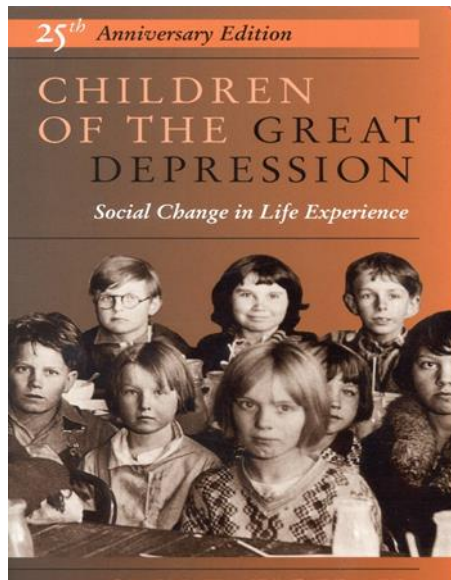
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北京大学人口所 中国人口学会副会长；《人口与发展》杂志执行

主编：国际健康寿命研究组织核心组成员，国际历史人口委员会理事

会成员。曾担任过国际计划生育联合会亚洲、大洋洲地区理事；联

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（美）北卡罗来那大学社会学系 美国艺术和科学院院士（1988年当选）；生命历程研究的奠基人和开拓者；曾任美国社会学会副会长；被美国、德国、瑞士等多个国家的著名大学授予名誉博士学位。

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Institute of Psychology, Chinese Academy of Science

中国科学院心理研究所 国际应用心理协会（IAAP）秘书长；中国心理学会副秘书长、常务理事、老年心理学专业委员会主任；中国科学院心理研究所研究员、学位委员会主任

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（美）纽约州立大学布法罗分校社会学系 曾担任中央财经大学社会发展学院创院院长(2006-2016)。曾主编、参编出版著作 10 余部，主持过 3 项由美国国立卫生研究院（NIH）资助的研究项目。

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北京大学人口所 中国人口学会副会长；《人口与发展》杂志执行主编；国际健康寿命研究组织核心组成员，国际历史人口委员会理事会成员。曾担任过国际计划生育联合会亚洲、大洋洲地区理事；联合国人口司、联合国人口基金会特聘专家，《人口研究》杂志主编。

**Prof. Wenzhen Ye, 叶文振 教授**

School of Public Affair, Xiamen University

厦门大学经济学院 美国犹他大学博士、普林斯顿大学博士后；曾任厦门大学公共事务学院副院长、人口所所长、福建江夏学院副校长；中国妇女研究会副会长；中国人口学会常务理事。

The Life Cycle: Biology and Social Sciences

- Biological: early infancy – infant and child development (physiological changes in brain functioning, growth, ability to walk, communicate, reason, learn).
  - Puberty– development of sexual capacity and bodily changes
  - Physiological decline – appearance, loss of mobility, aging

- Social Stages: Childhood, Adolescence, Young adulthood, Middle Age, Old age,
- Family Formation, marriage, reproduction, parity, marital dissolution, post reproductive life
- Schooling, Work, Retirement
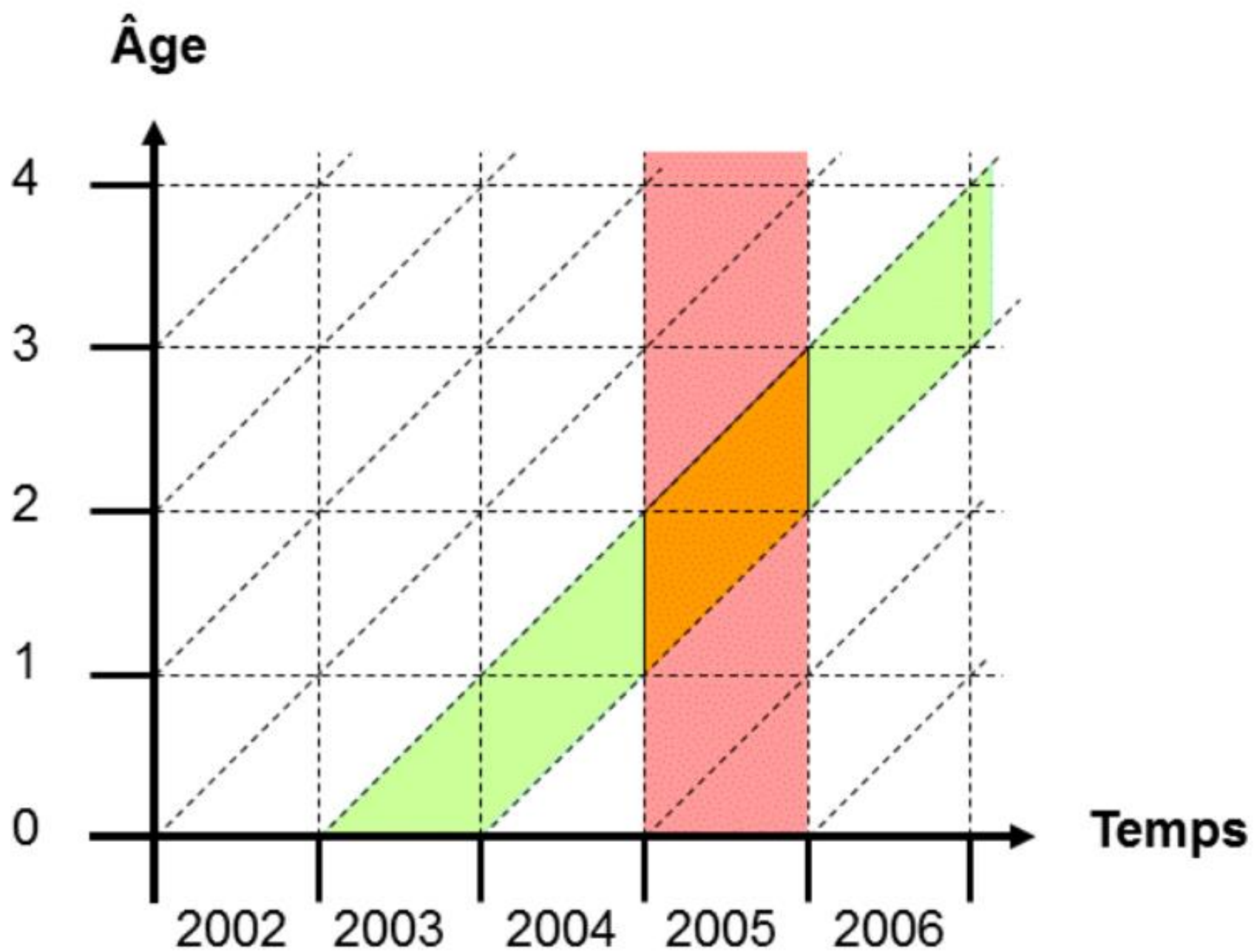
THE COHORT AS A CONCEPT IN THE STUDY OF SOCIAL CHANGE *

Norman B. Ryder

University of Wisconsin

Society persists despite the mortality of its individual members, through processes of demographic metabolism and particularly the annual infusion of birth cohorts. These may pose a threat to stability but they also provide the opportunity for societal transformation. Each birth cohort acquires coherence and continuity from the distinctive development of its constituents and from its own persistent macroanalyic feaures. Successive cohorts are differentiated by the changing content of formal education, by peer-group socialization, and by idiosyncratic historical experience. Young adults are prominent in war, revolution, immigration, urbanization and technological change. Since cohorts are used to achieve structural transformation and since they manifest its consequences in characteristic ways, it is proposed that research be designed to capitalize on the congruence of social change and cohort identification.
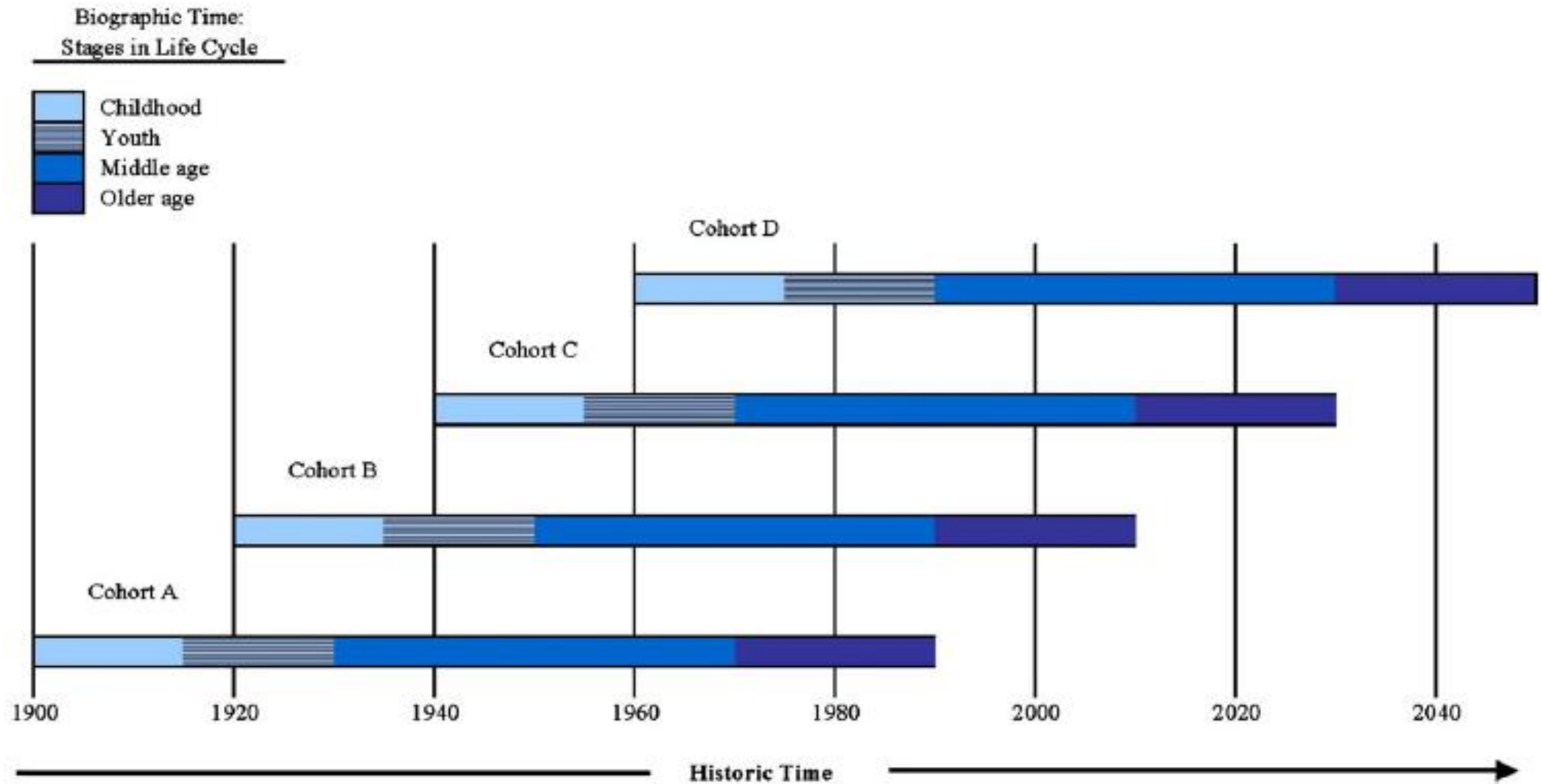
Birth Cohorts and Social Change

Figure 1. Intersection of biographic and historic time within the age stratification/life course framework.

Demographic Perspective

- **Age-Period-Cohort Models – APC model**

- Age: life cycle from birth to death (stages)
  - Biological basis of maturation, sexual maturity, and aging
  - Social, cultural, economic stages of life—time and place

- Period: historical events and also periods of social change
  - war, revolution, depressions, natural or man-made catastrophes
  - Socioeconomic development, technological change

- Cohort: life cycle stages, transitions, formative experiences (Ryder 1965)
  - Vary with historical period – especially events from adolescence to early adulthood
  - early life conditions have strong influence on subsequent outcomes

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Age Patterns

- Human maturation and aging
  - Infancy, childhood, adolescence, early adulthood, middle adulthood, old age, death
- Sexual maturity and procreation
  - Puberty, romantic attraction, reproduction, menopause
- Family formation (family life cycle)
  - Leaving parental home, union (marital) formation, childbearing, parenting, children leaving home, marital dissolution
- Socioeconomic life cycle
  - SES of family of origin, education, migration, first job, occupation, earnings
- Political socialization
  - Family socialization, political events of youth, mass mobilization, voting patterns
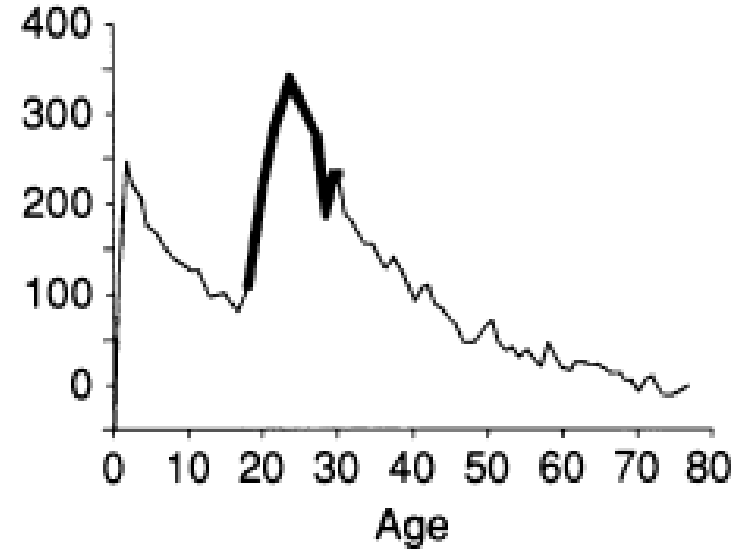
Changes in Mortality, 1925-2007
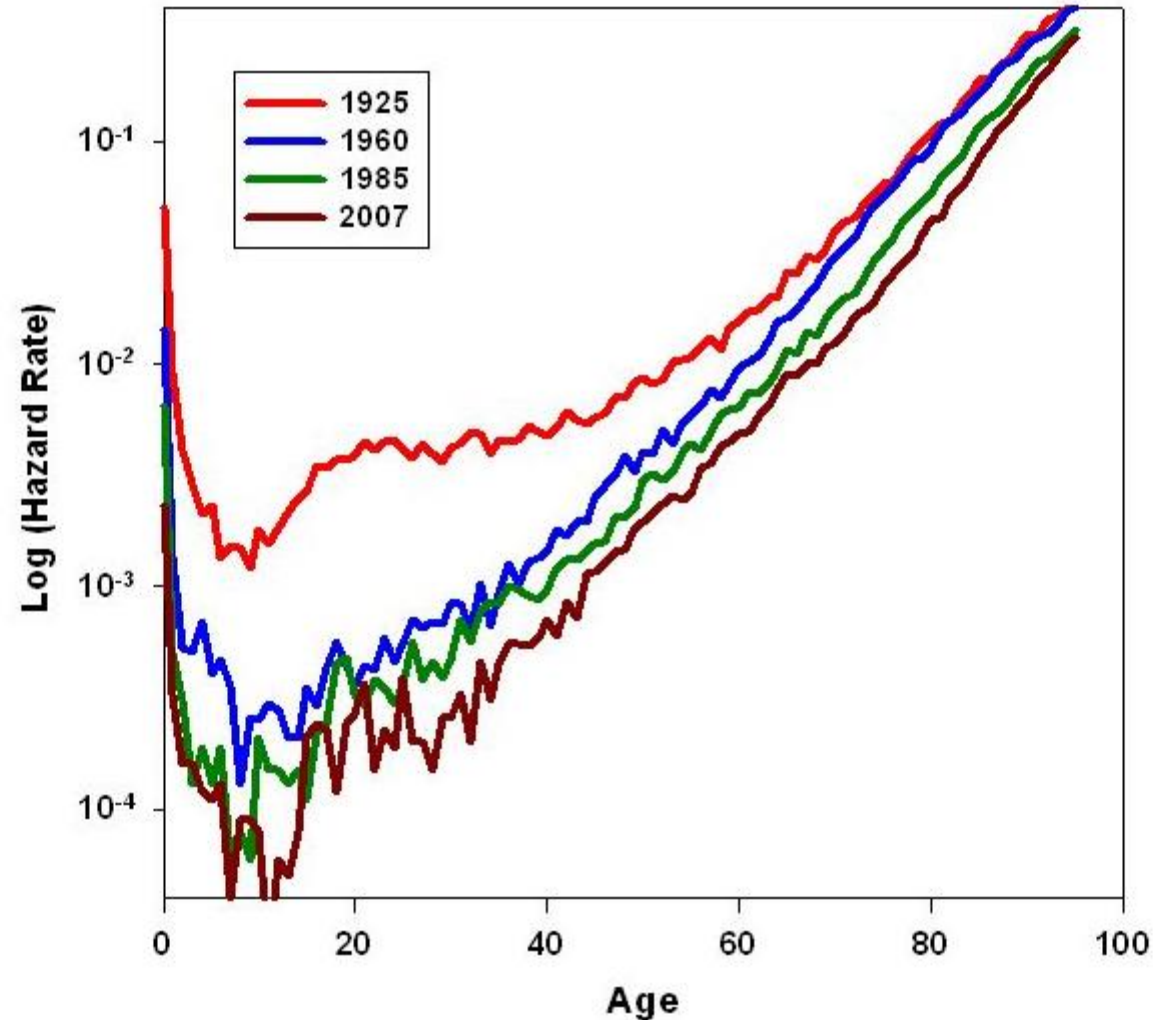
Swedish Females. *Data source*: Human Mortality Database

Panel A. Fertility Rates
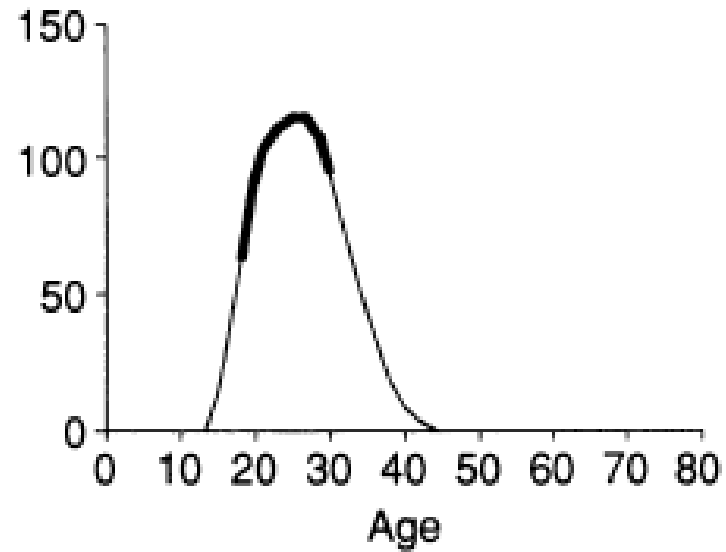
Panel B. Residential Mobility Rates

Panel C. Rate of Moving across County Lines
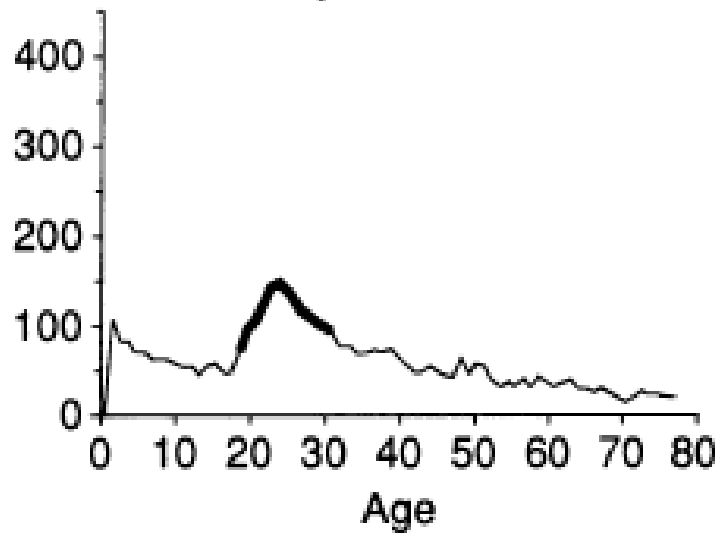
Panel D. Probabilities of Dying
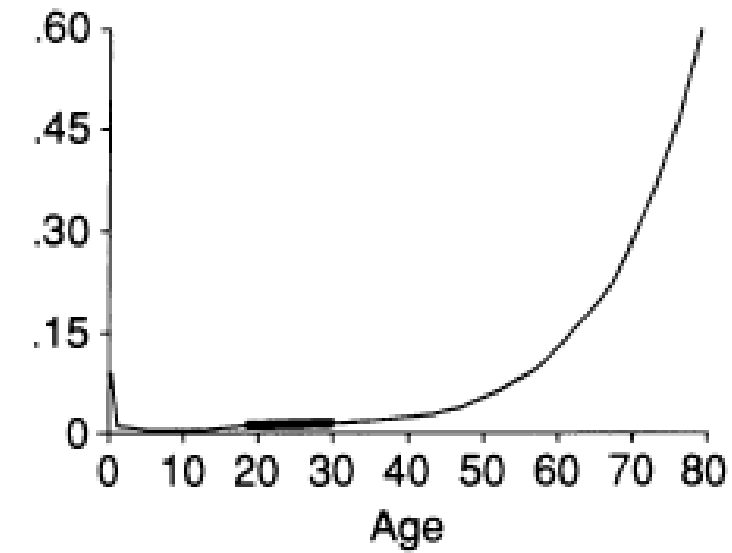
Figure 1. Age-Specific Fertility, Mortality, and Migration Rates per 1,000, 1987
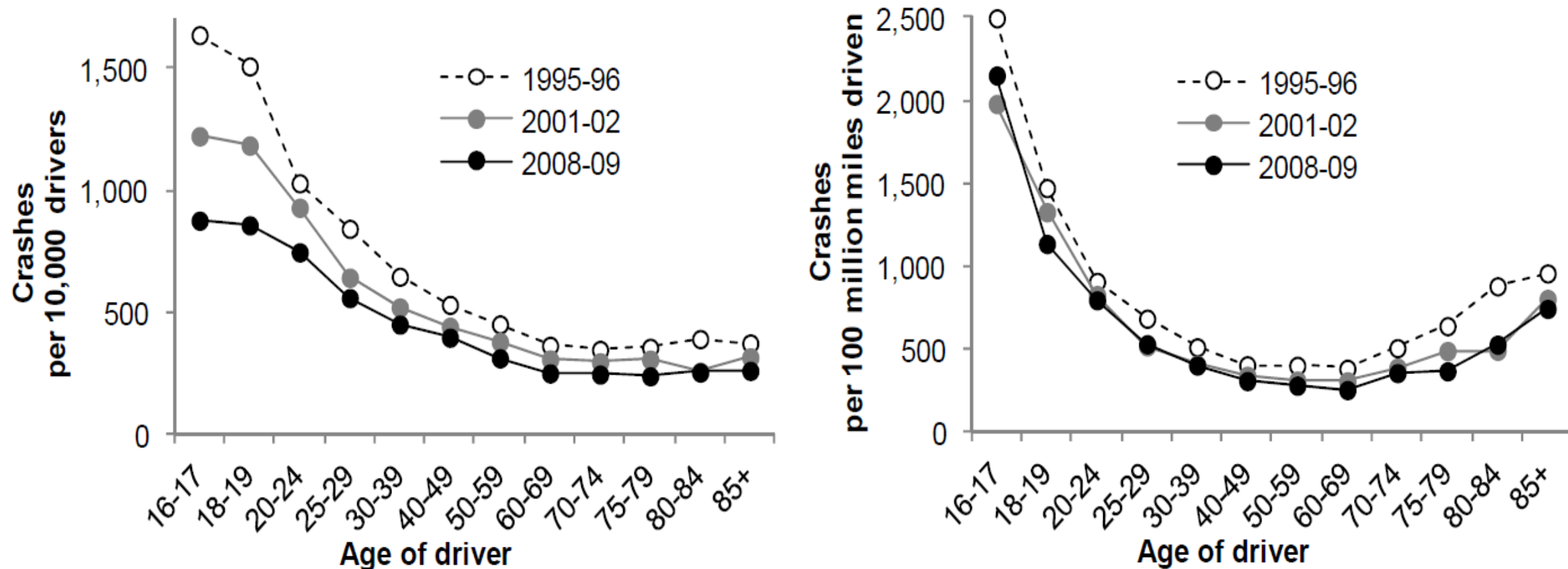
Figure 2. Drivers Involved in Police-Reported Crashes per 10,000 Drivers (Left) and Per 100 Million Miles Driven (Right) in Relation to Age of Driver, U.S., May 1995 – April 1996, May 2001 – April 2002, May 2008 – April 2009.

Source:
Motor Vehicle Crashes, Injuries, and Deaths in Relation to Driver Age: United States, 1995–2010 *(November 2012)*

The peak rate for for offending is at age 17
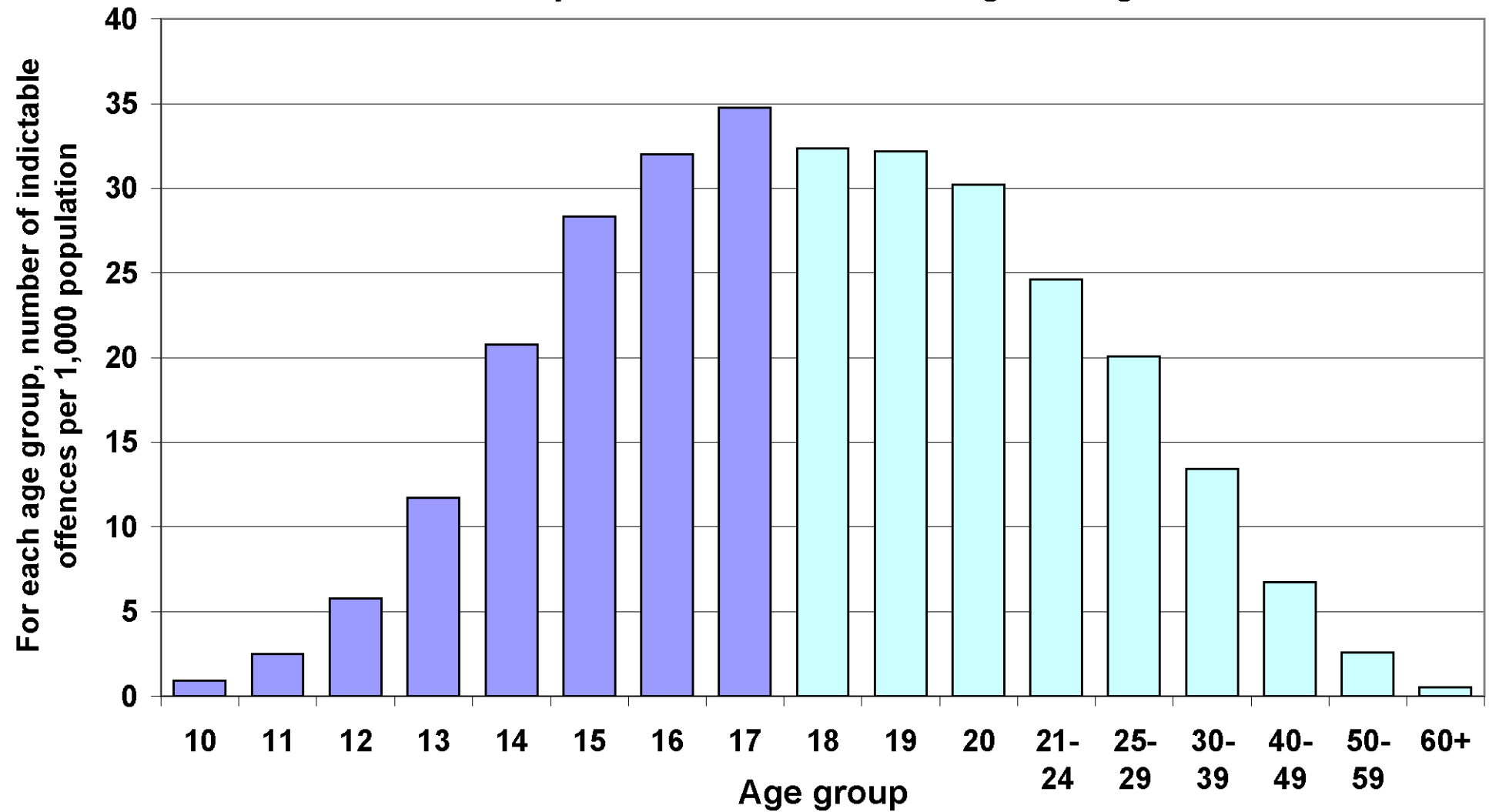
For each age group, number of indictable offences per 1,000 population

Age group: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21-24, 25-29, 30-39, 40-49, 50-59, 60+

Period Events = History = Social Change

- Human History – long epochs with bursts of revolutionary change
  - Hunting and gathering societies – 90% of human history
  - Agrarian societies – begin about 10,000 years ago
  - Industrial societies– about 250 years ago

- Other forces: trade, demographic growth, technology, transportation, production, educational opportunity, natural and man-made catastrophes

- Events: wars, political, disease, religious, and cultural movements,

- All of these conditions, forces, institutions, and events have strong impact on family, socialization, economic welfare, mortality, migration
  - Not all people are equally affected during periods of social change
  - Youth and young adults are generally "in transition" and most likely to be mobilized by war and ideology

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20th Century Historical Events in United States

- World War I

- Influenza epidemic of 1918

- Great Depression of the 1930s

- World War II and mass mobilization

- Rapid economic growth and expansion of higher education

- 1960s social, cultural, political, and gender revolutions

- Decline of manufacturing and development of high tech economy

- Mass immigration from 1970s to present

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Inter-Cohort and Intra-Cohort Change

- Cohort – a group (aggregate) of individuals who experience the same event in the same time (historical) interval. For example, the birth cohort of 2000 includes persons born in the year 2000.
    - Ryder, Norman.(1965). The cohort as a concept in the study of social change. *American Sociological Review, 30,* 843–861.
- Inter-cohort change—the comparison between cohorts. For example, inter-cohort change in median age at first marriage, percent ever married, mean number of children, or average life span.
- Intra-cohort change—the comparison of earlier events on later events for the same cohort. For example, educational attainment and earnings, childhood health and adult morbidity, parental divorce on own marital stability
- Can also study intra-cohort change between birth cohorts.

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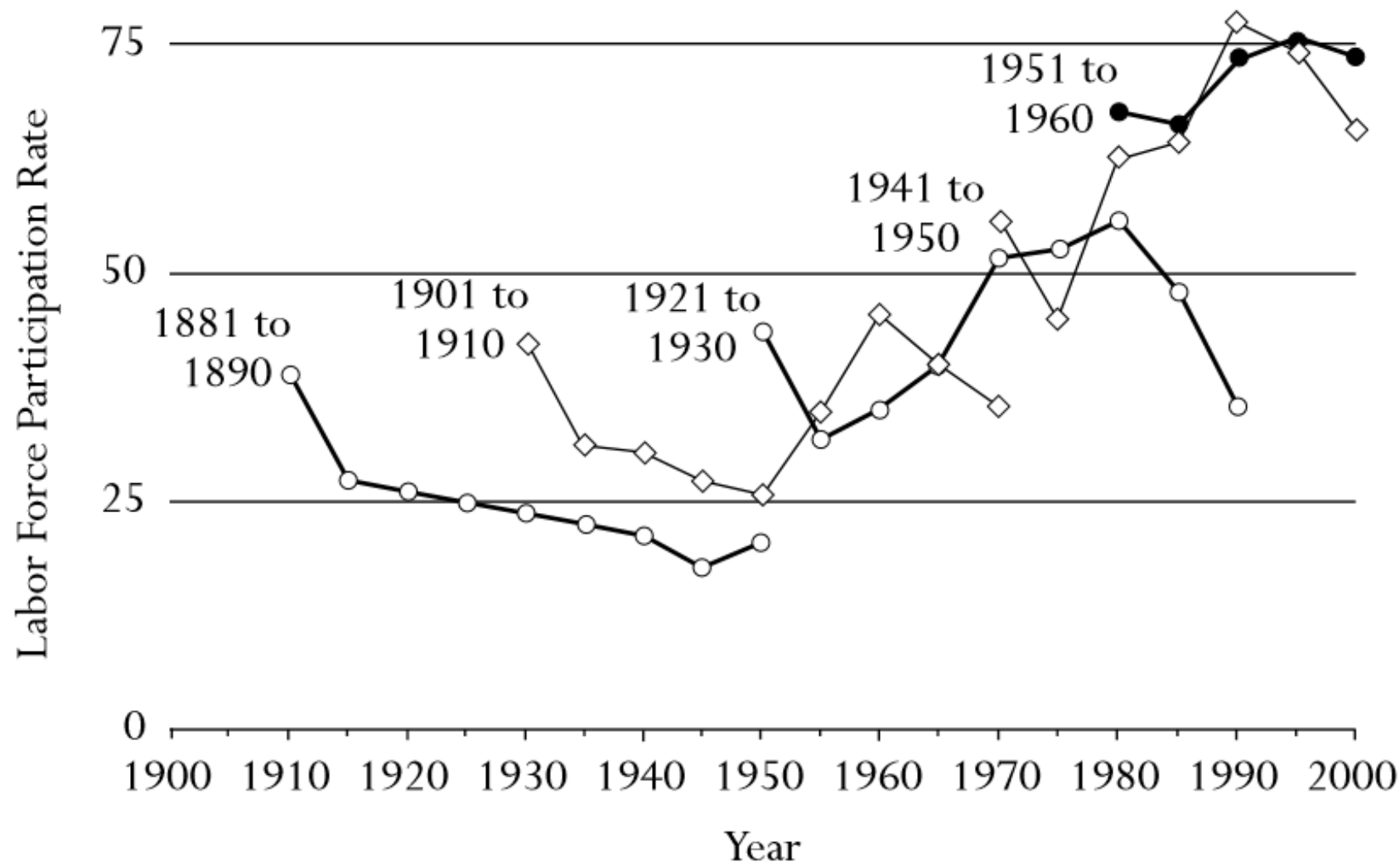
What is the trend in breastfeeding of infants?

- Measures of "trend?"
    1. Birth cohort of mothers
    2. Year of birth of first child?
    3. Both have independent effects

Cross-sectional survey of women in 1965 with retrospective question about breastfeed of first child

- Age at interview = birth cohort of mother

- Questions about the year of birth of each child

Source

- Charles Hirschman and James A. Sweet. 1974. "Social Background and Breast Feeding Among American Mothers." Social Biology 21(Spring): 39-57. +

PERCENTAGE OF MOTHERS WHO BREASTFED THEIR FIRST BABY AND NUMBER OF MOTHERS IN UNWEIGHTED SAMPLE BY MOTHER'S BIRTH COHORT AND YEAR OF BIRTH OF INFANT: MOTHERS, AGE 15–54, IN 1965 NATIONAL FERTILITY SURVEY

Mother's Birth Cohort	Mother's Age in 1965	Year of Birth of First Baby and Age Range of Sample Mothers								Total
		1926–30 (11–19)	1931–35 (11–24)	1936–40 (11–29)	1941–45 (11–34)	1946–50 (11–39)	1951–55 (11–44)	1956–60 (11–49)	1961–65 (11–54)	
		Percentage of Mothers Breastfeeding								
1911–15	50–54	81	72	71	57	55	*	*	...	68
1916–20	45–49	...	70	82	65	40	36	*	...	65
1921–25	40–44	...	*	75	66	52	48	31	26	58
1926–30	35–39	...	...	*	64	50	47	29	16	48
1931–35	30–34	...	...	...	*	60	47	39	42	46
1936–40	25–29	...	...	...	...	...	46	35	34	36
1941–45	20–24	...	...	...	...	...	*	38	34	35
1946–50	15–19	...	...	...	...	...	...	*	21	22
Total	...	81	72	77	65	50	46	36	32	50
		Number of Mothers; Unweighted Sample Size								
1911–15	50–54	47	113	71	47	19	5	2	...	304
1916–20	45–49	...	51	130	115	68	15	4	...	383
1921–25	40–44	...	4	99	350	308	112	42	11	926
1926–30	35–39	...	...	1	87	405	246	75	25	839
1931–35	30–34	...	...	...	4	135	434	245	73	891
1936–40	25–29	...	...	...	...	...	138	435	197	770
1941–45	20–24	...	...	...	...	...	3	191	483	677
1946–50	15–19	...	...	...	...	...	...	3	120	123
Total	...	47	168	301	603	935	953	997	909	4,913

* Less than 10 cases in cell.

POLITICAL INDEPENDENCE AND EDUCATIONAL OPPORTUNITY IN PENINSULAR MALAYSIA*

CHARLES HIRSCHMAN

Duke University

Prior to the Independence of Peninsular Malaysia (Malaya) in 1957, there had been a general rise in educational achievement across cohorts, but only slight moderation in educational inequalities between sexes, ethnic communities, and regions. But for cohorts who experienced part or all of their schooling after Independence, there has been a very rapid growth in both educational achievement and equality. Most of the reduction in inequality appears to be due to greater accessibility of primary schooling and increased mobility from primary to secondary schools. While the findings remain tentative because most of the post–Independence cohorts were still in the midst of their educational careers at the time of data collection in 1970, I conclude that the policies of the independent government led to a substantial reduction in educational disparities. The analysis is based upon data from the 1970 Census of Population of Peninsular Malaysia.

Table 2. Mean Years of Education and Educational Continuation Ratios of the Domestic Born Population by Birth Cohort: Peninsular Malaysia: 1970

Birth Cohort	Year Cohort Age Six	Years of Education			Continuation Ratios							
		Mean	SD	Coefficient of Variation	None to Some Primary	Some Primary To Complete Primary	Complete Primary to Lower Sec.	Lower Sec. to L.C.E.	L.C.E. to Middle Sec.	Middle Sec. to S.C.	S.C. to Upper Sec.	Upper Sec. to H.S.C.
1910 or before	(1916 or before)	1.09	2.29	2.10	.24	.37	.39	.56	.90	.54	.19	a
1911–15	(1917–21)	1.64	2.64	1.61	.36	.38	.34	.69	.85	.62	.16	a
1916–20	(1922–26)	1.97	2.89	1.47	.41	.41	.38	.65	.91	.66	.13	a
1921–25	(1927–31)	2.17	2.84	1.31	.47	.39	.33	.66	.88	.55	.16	a
1926–30	(1932–36)	2.45	2.84	1.16	.54	.37	.33	.60	.85	.65	.17	.48
1931–35	(1937–41)	2.79	3.05	1.09	.59	.39	.39	.66	.88	.63	.18	.57
1936–40	(1942–46)	3.64	3.34	0.92	.69	.49	.42	.68	.84	.64	.22	.65
1941–45	(1947–51)	4.61	3.50	0.76	.79	.59	.45	.72	.80	.69	.23	.64
1946–50	(1952–56)	5.67	3.50	0.62	.88	.71	.49	.68	.80	.69	.29	.62
1951–55	(1957–61)	6.39	3.23	0.51	.92	.78	.66	a	a	a	a	a
1956–60	(1962–66)	4.54	2.17	0.48	.94	a	a	a	a	a	a	a
Total	—	4.28	3.38	0.79	.76	.58	.52	.46	.78	.53	.26	.48

a Less than 20 cases or the cohort has not yet reached this educational level.

Source: .02 sample of 1970 Census of Population of Peninsular Malaysia.

Life Course Research

- Begin with clear question of how social change (history) affects inter-cohort (or intra-cohort) life
  - Examples:
    - Do periods of war disrupt normal patters of family formation
    - Do the political attitudes of youth persist to old age

- Organize data for inter- and intra-cohort analysis

The Intersection of Birth Cohorts and Recent Vietnamese History

Birth Cohorts	(Age in 1991)	HISTORICAL ERA			
		1975-1990 Post-Unification	1965-1974 American War	1955-1964 Post-Geneva Lull	1945-1954 French War
1925-1934	(55-64)				Young Adult
1935-1944	(45-54)			Young Adult	Youth
1945-1954	(35-44)		Young Adult	Youth	
1955-1964	(25-34)	Young Adult	Youth		
1965-1974	(15-24)	Young Adult/Youth			

FROM HIGH SCHOOL TO COLLEGE

Today, over 75 percent of high school seniors aspire to graduate from college. However, only one-third of Americans hold a bachelor's degree, and college graduation rates vary significantly by race/ethnicity and parental socioeconomic status. If most young adults aspire to obtain a college degree, why are these disparities so great? In *From High School to College*, Charles Hirschman analyzes the period between leaving high school and completing college for nearly 10,000 public and private school students across the Pacific Northwest. Hirschman finds that although there are few gender, racial, or immigration-related disparities in students' aspirations to attend and complete college, certain groups succeed at the highest rates. He also documents that racial disparities in college graduation rates remain stark. In his sample, 35 percent of white students graduated from college within seven years of completing high school, compared to only 19 percent of black students and 18 percent of Hispanic students. Students' socioeconomic origins-including parental education and employment, home ownership, and family structure-account for most of the college graduation gap between disadvantaged minorities and white students. With a growing number of young adults seeking college degrees, understanding the barriers that different students encounter provides vital information for social scientists and educators. *From High School to College* illuminates how gender, immigration, and ethnicity influence the path to college graduation.

"At a time of increasing diversity and inequality in U.S. society, understanding inequality in college graduation is more important than ever. With unique data and a nuanced understanding of the college attainment process, Charles Hirschman offers new insights on how inequality is generated and how greater equity may be pursued."   —ADAM GAMORAN, president, William T. Grant Foundation

"Charles Hirschman takes on one of the most vexing questions in American social stratification-why have rates of college completion stagnated for the last few decades? And why do traits like ethnicity and race and gender continue to shape young people's educational attainment? This masterful study of 10,000 students provides a sophisticated and rigorous examination of the college pathways of young Americans. *From High School to College* teases out the effects of immigrant generation, parental social class, and cultural variables to explain why men and some racial and ethnic minorities have fallen behind. This welcome addition to our knowledge of why some children succeed in getting a college education should be required reading for policy makers, social scientists, and everyone concerned with America's educational inequalities."

—MARY C. WATERS, M.E. Zukerman Professor of Sociology, Harvard University

"Charles Hirschman has ably extended the conditional educational transition model of Robert Mare and combined it with the insights of William Sewell and his colleagues in a comprehensive and intensive analysis of college aspirations, preparation, and attainment. Beginning with a simple, five-step model of the post-high school educational process, *From High School to College* addresses the influences of socioeconomic background, gender, academic performance, social influences, culture, work, and social participation in the high school years. The ethnic heterogeneity of Hirschman's Washington State sample and an embedded experiment in support for low-income students add dimensions to the analysis that amplify its implications for educational policy and practice."

—ROBERT M. HAUSER, executive director, Division of Behavioral and Social Sciences and Education, National Academies of Sciences, Engineering, and Medicine

FROM HIGH SCHOOL TO COLLEGE

FROM HIGH SCHOOL TO COLLEGE

GENDER, IMMIGRANT GENERATION, AND RACE-ETHNICITY

HIRSCHMAN

EXPECTATIONS
ASPIRATIONS
PREPARATION
ENROLLMENT
GRADUATION

CHARLES HIRSCHMAN

What is the trend in college graduation in the US?

- Trend is based on educational attainment of successive birth cohorts
  - Index birth cohorts by time period of attending college—about 20 years later
  - Example: birth cohort of 1950-54 attended college in 1970-74

Data:

Question on highest level of education completed from 1990, 2000, and 2010 U.S. Censuses

When is college completed?

Usually assume that higher education is completed by age 25, but some continue to complete college at later ages

-- Mid to late 20s

---Early 30s

Source:

Charles Hirschman. 2016. *From High School to College: Gender, Race-Ethnicity and Immigrant Generation*. NY: Russell Sage Foundation Press.

Table 2.1 **Percent of College Graduates in the U.S. Population by Birth Cohort Based on Age Groups in 1990, 2000, and 2010: Based on the 1990 and 2000 Population Censuses and the 2010 American Community Survey**

| Birth Cohort | Year Age 20 | Age Reported in | | | Percent College Graduate Reported in | | | Apparent Intracohort Percentage Point Chang | |
		1990 Census	2000 Census	2010 ACS	1990 Census	2000 Census	2010 ACS	1990–2000	2000–201
1920–1924	1940–1944	65–69			12.5%				
1925–1929	1945–1949	60–64			14.9				
1930–1934	1950–1954	55–59	65–69		17.2	18.0%		0.8	
1935–1939	1955–1959	50–54	60–64		19.4	20.3		0.9	
1940–1944	1960–1964	45–49	55–59	65–69	23.6	24.7	25.7%	1.1	1.0
1945–1949	1965–1969	40–44	50–54	60–64	27.7	29.1	30.1	1.4	1.1
1950–1954	1970–1974	35–39	45–49	55–59	26.4	28.4	29.5	2.0	1.0
1955–1959	1975–1979	30–34	40–44	50–54	23.3	25.9	27.4	2.5	1.5
1960–1964	1980–1984	25–29	35–39	45–49	22.1	25.8	27.9	3.8	2.0
1965–1969	1985–1989		30–34	40–44		27.9	30.7		2.7
1970–1974	1990–1994		25–29	35–39		27.2	31.9		4.6
1975–1979	1995–1999			30–34			32.1		
1980–1984	2000–2004			25–29			30.5		

Source: Author's compilation from Ruggles et al. 2015.

Figure 2.2   **Percent of College Graduates in the U.S. Population by Birth Cohort (Year Cohort Turned Age Twenty), Based on the 1990 and 2000 Censuses and the 2010 American Community Survey**
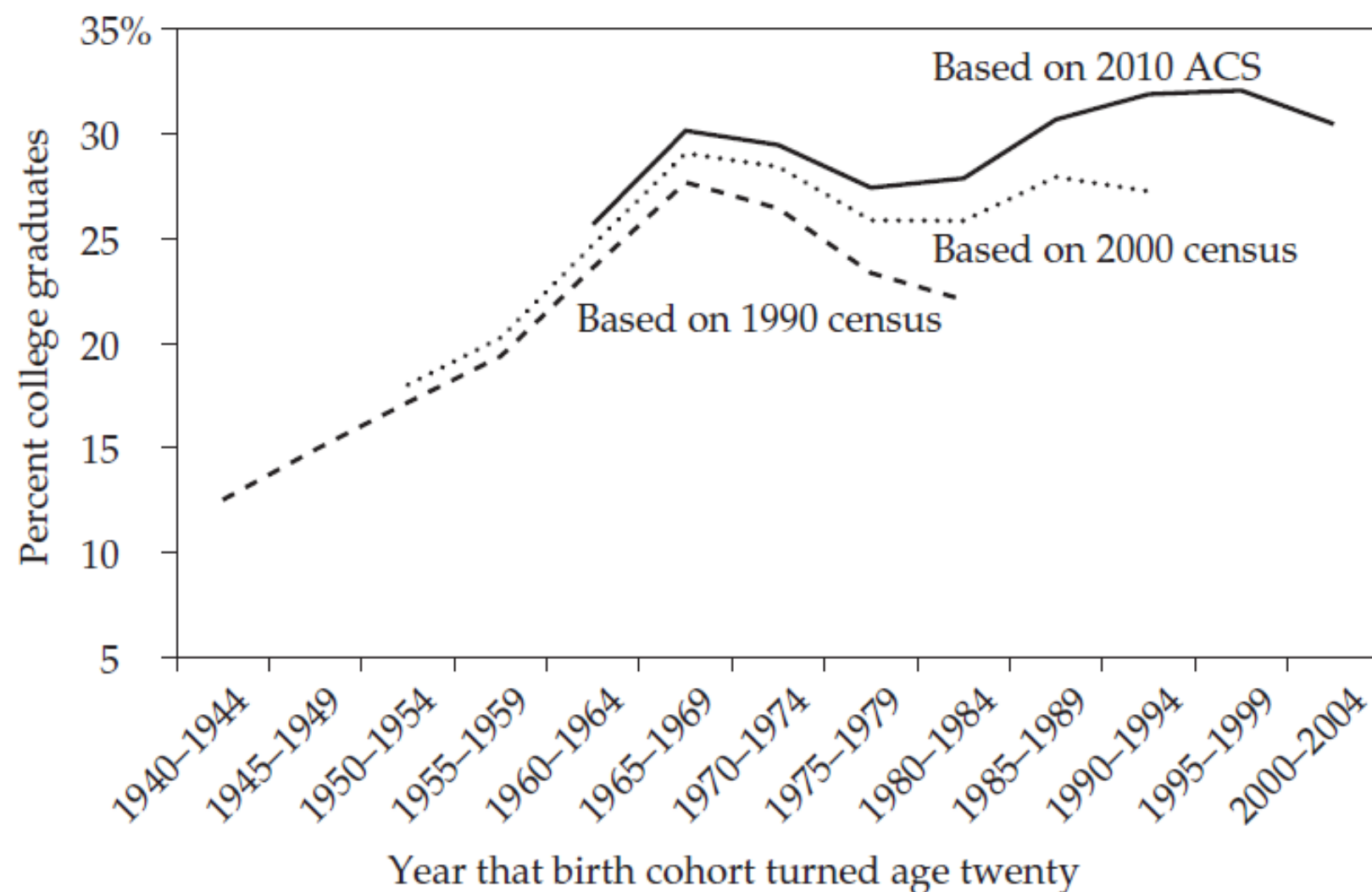
Source: Author's compilation from Ruggles et al. 2015.

Generations and Life Course Trajectories

- The Lost Generation

- Children of the Great Depression

- The "Greatest Generation" – who fought in World War II

- The Silent Generation – those who grew up in the 1950s

- The Baby Boomers (also 1960s generation)
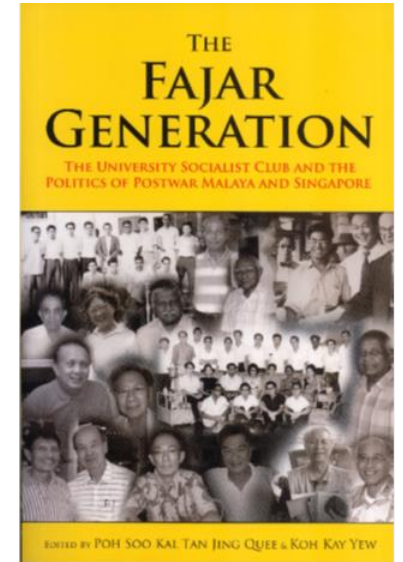
- Generation X

- The Millennials

- Generation Z

Formative Eras for Youth and Young Adults in China

- Prior to the 1949 Revolution

- National Unification and Mao Era, 1949-1979

- Post Reform Era, 1979- Present

Formative Eras for Youth and Young Adults in Malaysia

- 1950s and The Fajar Generation

- 1957 -1974: The Era of Student and Political Activism

- ….

- ……

The Fajar Generation

- University of Malaya: 1947
  - Raffles College and King Edward VII Medical College
- University Socialist Club: Founded 1952
  - *Fajar* (USC magazine in 1954) "Dawn" in Arabic
    - Banned in 1963
  - Poo Soo Kai, Rajakumar, James Puthucheary, Abdullah Majid, P. Arudsothy, Edwin Thumboo, Wang Gungwu, Agoes Salim, Syed Husin Ali, Lim Hock Siew, Admad Mustafa
  - Socialism = anti-colonialism and represented an ideology that transcended race and racial ideologies
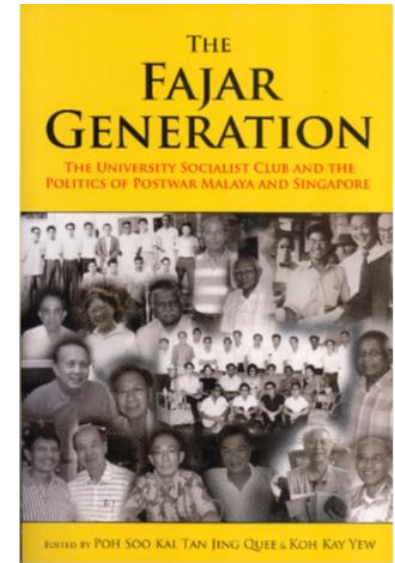
Life Course Research: Theory and Practice

- Assumptions:

1. Life course consists of timing, transitions, sequences, stages of maturation, aging, experiences, and outcomes that vary within and between societies.

2. Life course is interconnected—early life experiences shape adult lives.

3. History affects groups differently, depending on stage of life, resources, etc.

- Life Course Data:

1. panel data or retrospective life history

2. Repeated cross-sections to capture multiple cohorts

- Demographic Age-Period-Cohort Model is analytical framework to study change in life course through inter-cohort and intra-cohort comparisons.

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