Translation Matters

Racial Classification in South Korean Genetic and Genomic Research

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Abstract *This chapter explores the use of human group classifications in scientific articles related to genetic research in South Korea. Building on a systematic literature review of human group categories in South Korean genetic research, it reveals that while South Korean geneticists and genomicists rarely use the English term "race," they frequently rely on its Korean equivalent, "injong," as well as the more ambiguous category "minjok," which is often used in a similar sense. The widespread use of injong and minjok in South Korean genetic and genomic research not only reinforces biological distinctions between Koreans and non-Koreans but also risks creating a public misconception that genetic and genomic research supports the concept of biological race. With this case study, I argue that historians of science and technology, as well as science and technology (STS) scholars, should critically examine the translation of group categories across different national contexts.*

Introduction

In the fall of 2018, when I interviewed Jong Hwa Park, a leading scholar in South Korean genomic research, he insisted that the idea of "race" ("injong" in Korean, 人種 인종) was totally refuted by genomic research on human diversity and that only "ethnic groups" ("jongjok," 種族 종족 or "injok," 人族 인족 in Korean) were a valid grouping category (Park 2018). In another interview that I carried out with Han-jun Jin, one of the pioneers in the genetic history of Koreans, this geneticist also agreed that concepts of race are totally outdated and not used in genetic history research anymore (Jin 2017). According to those geneticists, the idea of race had already receded from South Korean genetic and genomic research by the 1990s. South Korean geneticists' belief in the absence of racial categories more or less resonates with the wider public's belief that racism is lacking in South Korea, since the majority of the country is made up of ethnic Koreans, with only a few foreign residents mostly from other Asian countries (Lie 2014, 8–15). This belief holds

that Koreans do not use racial categories in everyday life, resulting in a weak awareness of race as a category.[1]

To scrutinize the views of these geneticists, this chapter examines the use of human group classifications in scientific articles related to genetic research in South Korea. Based on a systematic literature review on the use of human group categories in South Korean genetic research on Koreans, it aims to uncover the complex use of these categories in both English and Korean. South Korean geneticists and genomicists mostly do not use the English term "race" in their English abstracts or in English papers. However, in Korean papers, they still frequently use its Korean translation "injong" and an ambiguous group category "minjok" (民族, 민족) that is similar in some senses to that of race.[2]

This widespread use of the Korean categories of "injong" and "minjok" in South Korean genetic and genomic research reifies biological differences between Koreans and non-Koreans. Although further study is required, this categorizing practice in science might also risk misinforming the public that genetic and genomic research supports the idea of biological race. Throughout this case study, I argue that historians of science and technology and STS scholars should pay attention to the translation of group categories in different national contexts.

This chapter consists of four sections. The first section offers a historical background concerning the group classification in the sciences of human heredity in South Korea. It particularly focuses on the historical origins of Korean categories—"injong" and "minjok"—and their inclusion in human heredity research from a *longue-durée* perspective. The second section explains the method and database used for the systematic literature review. In the two final sections, I analyze the review result and discuss its social impact.

Historical Backgrounds

Korean historians and historical sociologists have come to a consensus that "injong" translates to the English term "race," while "minjok" translates to "nation." Furthermore, "jongjok" is considered the most accurate translation of "ethnic group" (Kim 2005; Kang 2022).[3]

Among those terms, "minjok" is often considered the most important in understanding modern Korean history, because it was the term that nationalist Korean intellectuals and political leaders chose to foster political aspirations of a Korean people in var-

1 South Korean historians and sociologists have recently criticized the widespread belief in a "race-free Korean society" by arguing that "racism without race" is prevalent in this country. See Na (2022) and Park (2019).

2 In South Korea, "injong" is a Korean translation of the English concept of race, while "minjok" corresponds to the concept of nation. However, "minjok" is used to indicate an ethnonational entity that shares history, language, culture, and sometimes blood, so it easily conflates other English concepts of race, ethnic group, and nation (Shin 2006).

3 South Korean historians and sociologists studying nationalism differentiate between ethnic nationalism, which is based on biological ethnicity, and civic nationalism, which relies on cultural integration (Kang 2019). In some cases, however, scholars have chosen to retranslate minjok as "ethnic nation" in English in order to emphasize its biological connotations (Shin 2006).

ious contexts. During the late Chosŏn dynasty (1392–1910), Koreans were pressured by the Western imperial countries and by the Japanese empire to open up the country to foreign trade. When it seemed evident that Korea would be colonized by the Japanese empire in the early twentieth century, Korean intellectuals used "minjok" to define the Korean people as a political unity regardless of having lost their state as a political entity. The trope of *Tanil minjok*—encompassing the idea that Koreans were nationally "pure" as they originated from a single ancestor and shared a singular history, language, and culture—played a large role in maintaining nationalistic independence movements during the colonial period and in advancing nation-building projects in the two Koreas during the postliberation period (Shin 2006). In this political history-centered narrative, "injong" quickly lost its importance among the nationalist intellectuals at the turn of the century with the rise of the term "minjok." Although "injong" was used by the colonial government and pro-Japanese intellectuals in encouraging cultural assimilation and claiming a "yellow-race" alliance against "white predation" during the colonial period, the concept lost its politico-ideological space in the postliberation period because the political leaders of the two Koreas each aimed to establish a nation-state based on the idea of Korean minjok (Tikhonov 2015).[4]

In contrast to this political history-centered narrative, the history of the concepts of *injong* and *minjok* and the ways in which they were adopted in science shows that there were no rigid boundaries between their translations, and this interchangeability was maintained in specific professional areas, especially in the field of human heredity, even during the post–WWII period. In East Asia, Japanese scholar Kazan Watanabe first introduced Johann Friedrich Blumenbach's five concepts of race in 1838, while enlightenment thinker Yukichi Fukuzawa devised the term "jinshu" (人種), written in Chinese characters, to explain Blumenbach's racial classification in Japanese in 1869. The same Chinese-character term, pronounced as *injong* in Korean, first appeared in Korea's first modern newspaper the *Hanseong Sunbo* (漢城旬報) in 1883 to explain Blumenbach's theory of five races (Na 2022: 81–82). In the 1890s, the term "injong" was also widely used to define the Korean people as an independent group that was politically and biologically distinct from neighboring groups. "Chosŏn [Korean] injong," for instance, was regarded as different from "Ilbon [Japanese] injong" and was "the top injong among the Oriental yellow races" (東洋黃種中第一等人種) (Na 2022: 90–93).

Meanwhile, the introduction of the term "nation" complicated the group classification in Korea. In 1876–1879, Japanese legal scholar and politician Hiroyuki Katō coined the term "minshu" (民種) to explain the difference between the German concepts of "Nation" and "Volk" in his Japanese edition of Swiss jurist and politician Johann Caspar Bluntschli's *Allgemeines Staatsrecht* (1868) (Park 2011). According to the classification presented by Katō, "Volk" indicated a political unit of a state, named "kokumin" (国民) in Japanese, while "Nation," translated as "minshu," meant a group of people who shared cultural commonalities and biological lineages. Katō's translations were widespread in East Asia, and Chinese politician and social activist Qichao Liang, who studied in Meiji

4 Racial categories translated from the Korean, such as white, black, and yellow, as well as caucasian and mongoloid., will be spelled lowercase in this article to reflect their status as translations, setting aside questions pertaining to their capitalization in English.

Japan, became a propagator of Katō's classifications. In the late 1890s. Liang modified Katō's term "minshu" to "minzu" (民族) by replacing the Chinese character "種" (shu) with "族" (zu) and used this term in his political writings. Liang arbitrarily used the term to indicate different grouping levels; for instance, Germans, Teutons, and white people were all referred to as "minzu" (Kang 2006).

In the same way, the same term written in Chinese characters, "minzu," pronounced as "minjok" in Korean, was also used interchangeably with "injong" in the early 1900s when Korean nationalists were strongly influenced by Liang's texts. For instance, in a news article published in 1900, "Tongbang [Oriental] minjok" was mentioned as being different from "Paegin [white] minjok." However, from 1905 onwards, the term "minjok" increasingly replaced "injong" in the political arena to indicate the Korean people as a political collective, and it became a core concept of Korean nationalist intellectuals opposed to the Japanese colonization of Korea (Kwon 2007).

In the field of anthropology, a similar change occurred in the 1920s and 1930s. While in Japan by the 1910s physical anthropologists used "jinshu" (人種) when classifying the Japanese and other neighboring people, e.g., "Nippon [Japanese] jinshu" and "Chōsen [Korean] jinshu." In the 1920s, the term "Nippon jinshu" was increasingly replaced with "Nippon minzoku" in the anthropological field (Sakano 2005). Similar changes can be observed in colonial Korea with Japanese anthropologists in colonial research institutions. In the late 1920s and the 1930s, Japanese anthropologists at Keijō Imperial University Medical School in Keijō (now Seoul) carried out extensive fieldwork in Korea and Manchuria, to study the biological characteristics of "Chōsen minzoku." According to Tsunekichi Ueda, who had been trained in anthropometry at Ludwig Maximilian University in Munich and was the leader of this colonial anthropological enterprise, Korean *minzoku* was "not the same Volk, but the same Rasse" as Japanese *minzoku* (Hyun 2023). His statement implied the biological proximities and cultural differences between the Japanese and Korean people but did not deny the presence of biological differences between the two groups. This small biological difference became the target of Japanese research in human heredity during the 1930s and the 1940s (Hyun 2023: 269–270). Korean scientists, who were trained under the Japanese colonial education system, internalized these group categorizations. For instance, Korean physical anthropologist Sejin Na, who was a member of Keijō's extensive survey team of Korean *minzoku*, came to consider the Korean *minjok* (*Hanminjok*) as a principal unit for his postwar research (Hyun 2019a).

After the liberation from Japanese imperialism as a result of the end of the Pacific War (1941–1945) and after the end of the Korean War (1950–1953), South Korean anthropologists and geneticists, including Na, sought to define the Korean people as a biological population distinct from its neighboring people, especially from their former colonizers (Hyun 2019a: 503–505). This was one way for them to contribute to building South Korea as a new nation-state. For instance, Yung-Sun Kang, a founder of South Korean genetics, in 1954 initiated a decade-long project focused on "genetic research on the Korean population," stating that its aim was to identify the biological nature of "Korean minjok" (Hyun 2019a: 505). In 1965, serological geneticist Samyŏl Yi more clearly claimed that his research on the blood group distribution in South Korea—indicating the "pure blood of Korean minjok" distinct from Japanese and other neighboring *minjok*—contributed to

the "scientific independence" of his new nation-state from Japanese colonialism (Hyun 2019b).

So far, the usage of *injong* in human heredity research in South Korea remains unexamined, while that of *minjok* has only been partially examined by a few case studies (Hyun 2018). In this respect, the systematic literature review of genetic and genomic research articles written in Korean after the Korean War can shed some light on the usage of the two Korean classificatory terms in South Korean genetic and genomic research. In the following sections, this chapter focuses on the scientific literature review in terms of classification use and its implications.

Method

I conducted a systematic literature review on the use of human group categories and their Korean translation in South Korean genetic research on Koreans. To do this, I utilized two national research databases: RISS (Research Information Sharing Service) and Korea Institute of Science and Technology Information's (KISTI) ScienceOn. RISS is the most comprehensive national database, containing 6,304,375 research articles (as of 2022) produced in all South Korean research institutions, including universities and colleges. ScienceOn has a science and technology focus and is helpful as it offers 328,615 national R&D reports (as of 2022) excluded from the RISS database. In both databases, I used the keyword "한국인 집단" ("han'gugin chiptan," Korean population) for the literature review search. In RISS, I searched for the term with the field limitation of "자연과학" ("chayŏn'gwahak," natural sciences) and "의약학" ("ŭiyak'ak," medical and pharmaceutical sciences) and with the time limitation from 1945 to 2022. In ScienceOn, I searched for the term with the search limitation of "보고서" ("pogosŏ," national R&D reports) with the time limitation from 1945 to 2022.[5]

As a result, I found 379 articles from 1963 to 2022 in RISS and 177 R&D reports from 1985 to 2022 in ScienceOn. Then, I excluded articles and reports that (1) were written only in English without a Korean title or abstract; (2) were nongenetic research (e.g., demography, public health, social psychology, or nutrition studies); or (3) were duplicates. After excluding those articles, I was left with 172 articles (1973–2022) from the RISS database and 97 R&D reports (1985–2022) from the ScienceOn database. Then, I classified all articles and R&D reports by discipline: (1) population genetics, (2) medical genetics, (3) forensic genetics, and (4) biological anthropology. Finally, I analyzed the English group categories and their Korean translations in those articles and reports.

5 National R&D reports are papers that are not peer reviewed and are used to report research results to government funders.

Analysis

Scientific Articles

Out of 172 scientific articles found in the RISS database, 105 articles were written in Korean, so I could identify the Korean translation of the English grouping categories: fifty-six articles, which were published from 1973 to 2022, used "minjok" as the Korean translation of "population," "race," "ethnic group," "geographic origin," and "ancestry." Nineteen papers, which were published from 1982 to 2021, used "injong" as the Korean translation for "population," "race," and "ethnic group." Twenty-nine papers (1981–2021) used "chiptan" as a Korean translation of "population" and "ethnic group," and among them, nine articles adopted racial classification, including "white" and "black" (see Table 1). Finally, only three articles (1994–1997) used "jongjok," and among them, two articles also used different group categories such as "minjok" and "injong." Even the one article that only used the term "jongjok" also adopted the racial classification of "white" and "black."

Figure 1: The Korean translation of the English grouping categories in scientific articles from 1972 to 2022 (n=105).

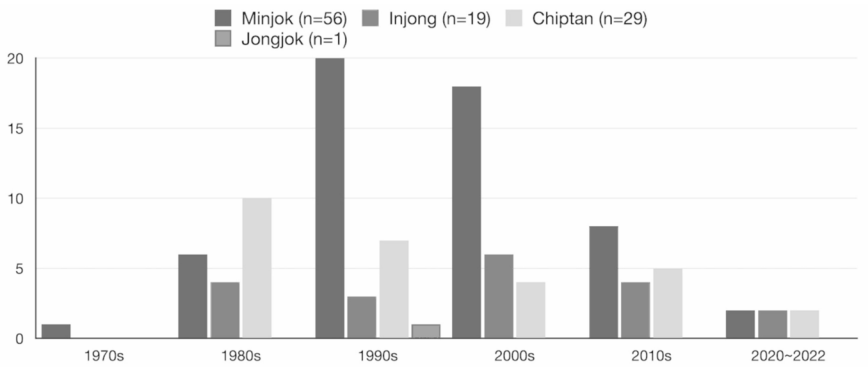


Table 1: Racial classifications used in scientific articles using the Korean translation of "chiptan."

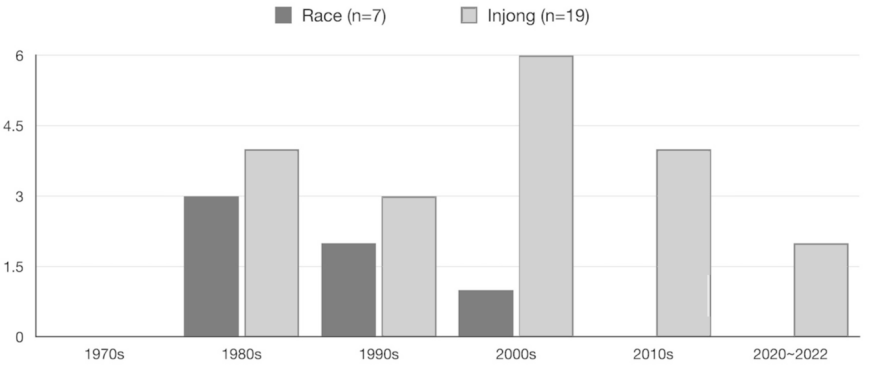
Author, Year, Title	Group Classification
Lee, KY, 1980, Genetic study of phenylthiocarbamide (PTC) taste in a Korean population (1)	Mongoloid, Caucasoid
Lim, NY, 1981, Abstracts of lectures and papers presented at the 4th Congress of the Korean Genetics Society	Caucasians
Lee, HK, and HW Shin, 1996, Genetic characterization of a DXYS17 locus hypomorphism in a Korean population	white population (*paegin chiptan*)

Author, Year, Title	Group Classification
Lee, HK, and HW Shin, 1996, Genetic characterization of hTPO locus hypomorphism in a Korean Population	white population (*paegin chiptan*)
Han, JS, et al., 1997, Cloning of the variable region of D8S210 locus and its application to the forensic individual identification for Korean population	whites (*paegin*)
Kim, KS, et al., 1999, Genetic analysis of three short tandem repeat loci and one variable number of tandem repeat locus in the Korean population	Caucasian population
Hong, KJ, et al., 2000, Allele frequency distribution of Two PCR-amplified loci in the Korean population	Caucasian population
Kim, DS, et al., 2014, Morphometric Analysis of the Skull by Moiré contourography	whites (*paegin*), blacks (*hŭgin*), Hispanic (*Hisŭp'aenik*)
Ahn, GS, et al., 2014, Polymorphism of ADRB2 genes, beta-2 adrenoceptor related to atopic dermatitis in Koreans	white lineages (*paegin kyeyŏl*)

The remaining articles (n=67) were written in English, and in most cases, it was not possible to identify Korean translations of grouping categories because of the short length of the Korean abstracts. Despite such limitations, the data offers a glimpse of which English group categories were used. Among them, twelve articles defined "chiptan" as equivalent to ethnic groups, while nine of them adopted racial classifications such as "Mongoloid," "Caucasoid," and "Negroid," or "Caucasian" and "Negroid." Seven papers used "race" to translate the Korean term "chiptan" into English, and among them, one paper used "race" and "ethnic group" interchangeably. Forty-eight articles used the term "population," and among them, thirty papers either adopted the aforementioned racial classification or defined population as "racial population."

Throughout all these papers, written either in English or Korean, "injong" was consistently used from 1982 to 2021. In contrast, its English equivalent "race" was used only from 1985 to 2004. The term "ethnic group" and its Korean equivalent "jongjok" were first used in 1987, but they were not widely used: the English term was not widely used after 2009, and "jongjok" had a much shorter life span, as it was only used three times in 1994 to 1997. Meanwhile, the English term "population" continued to be used from 1985 to 2014 while "chiptan" was used from 1981 to 2021. Among the Korean terms, "minjok" was used most consistently throughout all periods to translate all the English categories—race, ethnic group, and population—in fifty-six articles from 1973 to 2022.

Figure 2: A comparison of the word frequency between the English term "race" and the Korean term "injong" in scientific articles from 1972 to 2022.

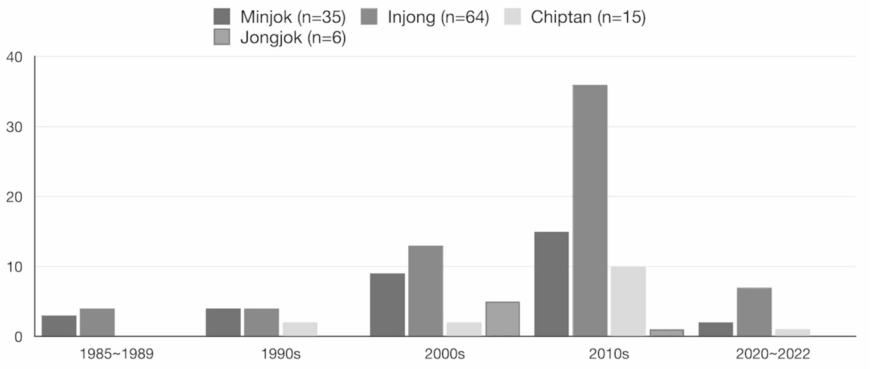


There are disciplinary differences in the use and translation of group categories. Population genetics articles used "race" and "injong" from 1982 to 1995 but changed them to "ethnic group" in 1997 and used that term until 2002. After that, "population" and "chiptan" became the dominant categories, although "minjok" was also used consistently. Forensic genetics was the field that used "minjok" most extensively throughout the first and second decades of the twenty-first century. Medical genetics papers used "race" and "injong" more than other genetic fields did. From 1996 to 2021, except for two articles, all scientific articles employing the categories "race" and "injong" came from the field of medical genetics. Biological anthropology used all grouping categories, but from 2013 onward, they started using "population" and "(ingu) chiptan" more often.

National R&D Reports

Although all the national R&D reports (n=92) found in the ScienceOn database were written in Korean, they also used English group categories in their abstracts and main parts. All papers used the English term "population" when translating "chiptan" into English, while fifteen reports also mentioned different English grouping categories: one report published in 1988 used the term "racial population," "race," and "racial characteristics" while mentioning the racial classification of "Caucasoid," "Mongoloid," and "Negroid" (Kim 1988). Between 1998 and 2020, four reports used the English term "ethnic group" interchangeably with "population," while ten reports categorized people as "Caucasian" or "Mongoloid" and "white" or "black" without explicitly mentioning the term "race."

Figure 3: The Korean translation of the English grouping categories in R&D reports from 1985 to 2022 (n=97). Nineteen articles used both "minjok" and "injong," while five articles used either/both "minjok" or "injong" with "jongjok." One article used "chiptan" and "injong" to criticize their use for human classification.



Only one report, published in 2018, problematized the mixture of diverse grouping ideas and conceptions, including "chiptan, injong, sŏnjo [ancestry], and kukka [nation-state]" (Kim 2018). Sixty-four papers, published between 1985 and 2022, used the term "injong" to translate "population," "race," "ethnic group," and "ancestry"; thirty-five reports, published from 1985 to 2020, used the term "minjok" to translate "population," "race," "ethnic group," and "ancestry." Among both groups of papers, nineteen reports used both "minjok" and "injong."

Meanwhile, the term "jongjok" was used only in six papers, and among them, five papers used that term along with other Korean translations, "minjok" and "injong." Fifteen papers used "chiptan" to translate the English word "population" while using the dichotomic category of "Westerners" (서구인, "sŏguin," or 서양인, "sŏyangin") and "Orientals" (동양인, "tongyangin").

Table 2: Racial classifications used in national R&D reports using the Korean translation of "jongjok."

Author, Year, Title	**Group Classification**
Kim, MS, 2002, National center for genomic research, part of the national institutes of health	*jongjok*, *injong*, and *minjok*
Shin, JK, 2007, Korean drug metabolizing enzyme and drug transporter protein genomics for personalized drug therapy	Asian *jongjok*, *minjok*, Westerners (서구인, *sŏguin*), and Africans (아프리카인, *ap'ŭrik'ain*)
Shin, MH, 2008, International cooperation cohort project I: overseas Korean American cohort project (3rd year)	*injong*, *minjok*, and *jongjok*

Author, Year, Title	Group Classification
Kim, YJ, 2008, Korean haplotype information development project; development of Korean HapMap Database	Korean, Chinese, and Japanese *injong*, Asian *injong*, and *jongjok*
Choi, BY, 2009, Rural community-based multiagency cohort projects	*jongjok*
Park, SK, 2020, Tracking Korean genomic epidemiology survey project and developing performance strategy	*jongjok*, *injong*, and *minjok*

Out of eighty reports which used "injong" and/or "minjok," twelve came from the population genetics field. Ten population genetics reports, published from 1985 to 1998, adopted both terms, but two reports, published in 2010, only used "minjok." Fifty-two reports published between 1994 and 2022 were categorized into medical genetics. Among them, sixteen reports adopted the term "minjok" and twelve of those sixteen reports also used "injong." The preference for "injong" was strong in the field of medical genetics: forty-eight medical genetics–related reports used that term. Of fifteen reports classified into the field of forensic genetics, "minjok" and "injong" were almost equally preferred: nine reports used "minjok" and ten used "injong," while four used both terms. Lastly, there was only one paper, published in 2018, that could be classified into the field of biological anthropology, and it explicitly objected to using "minjok" or "injong" as categories (Kim 2018: 3). The paper also cautioned about the mixture of the diverse grouping categories "chiptan, injong, sŏnjo, and kukka."

Discussion

The systematic literature review has revealed four key points. First, despite the decline in the use of the English term "race" since the mid-2000s, its Korean translation "injong" has continued to be frequently used in scientific articles (n=19, 1982–2021) and has even significantly increased in national R&D reports (n=64, 1985–2022). Second, the Korean term "minjok" is the most widely used translation for various English grouping categories in scientific articles (n=56, 1973–2022) and the second most common in national R&D reports (n=35, 1985–2020), following "injong." Third, the two Korean translations of "injong" and "minjok" have been used interchangeably for different English grouping categories such as "race," "ethnic group," "ancestry," and "population." Finally, there are disciplinary differences in the adoption of English grouping categories and their translations.

Table 3: Examples of the use of "injong" for translating the English words "ethnic group" and "population" after the 2000s.[6]

Author, Year, Title	Classification, Translation	Report Type	Field
Lee, YJ, 2004, Characterization of microsatellite markers covering chromosome 1 in the Korean and Japanese populations	ethnic group = *injong*	S	M
Chang, EH, 2012, Y haplogroup distribution in Korean and other populations	Western three *minjok* (African Americans, Caucasians, Mexican Americans) and East Asian *minjok* (Koreans, Japanese, and Chinese), population and ancestry = *minjok*	S	F
Kim, YJ, 2020, Study compares genetic effects of risk factors associated with diabetes and hypertension	Europeans and Orientals, ethnic group = *injong*	N	M
Chang, IJ, 2011, Study on the feasibility of sharing drug approval data between China, Japan, and Korea	Korean, Chinese, and Japanese injong, population = *injong*	N	M

The first two points indicate that, in contrast to humanities scholars and social scientists' usage of translations, "jongjok" was not used in scientific articles and R&D reports for translating the English term "ethnic group"; instead, in both cases, "injong" and "minjok" was mostly used to translate all English group categories, including "ethnic group." The result is in stark contrast to the explanations commonly found in South Korean social science and humanities literature. This literature describes "injong" as a social construct demystified by natural scientists, and "minjok" as a cultural grouping category unrelated to the biological characteristics of a specific human group (Kim 2020; Lee 2017; Kang 2022). However, as I showed earlier, the terms are still used in scientific articles to express biological differences between various human groups.

In terms of the third point, it is worth noting that both "injong" and "minjok" are used in various ways: South Korean geneticists and genomicists occasionally employ the term "injong" to differentiate between individuals of "Japanese," "Korean," and "Chinese" descent, although these groups are typically considered subgroups of the broader "Asian" race from an English-language perspective. This categorization is consistent with the early twentieth-century categorizations employed by Korean nationalists. The term "injong" is also used to distinguish between "Asians" and "whites" (Kim 2005). The term "minjok" is commonly used to describe populations from different Asian countries including

6 Report type: S=scientific article, N=national R&D report. Field: M=medical genetics, F: forensic genetics.

"South Korea, China, Indonesia, Japan, Philippines, and Thailand" (E.S. Kim 2020). However, that term is also used to classify "European whites" and "Asians," who are grouped based on racial categories from the English-language perspective (Zhang et al. 2012). This mixed use of *injong* and *minjok* resulted from translating diverse English terms into those two Korean terms. For instance, scientific articles and R&D reports related to the International HapMap Project and the 1000 Genomes Project adopted "injong" to translate the English terms "ethnicity" and "ancestry" (Park 2016; Choi 2020).

The disciplinary differences found in scientific articles and R&D reports indicate how the preferred terms in human grouping vary by discipline. In the field of population genetics, one can observe the decreased use of the English term "race" and its Korean translation "injong" simultaneously with the consistent preference for the Korean term "minjok." Biological anthropology papers stuck to the use of the English term "population" and the Korean translation "chiptan" while occasionally problematizing other Korean grouping categories. In the two applied fields, medical genetics and forensic genetics, the terms "injong" and "minjok" were consistently used in the 2010s and early 2020s, even though the English term "race" was not used at that time. Both Korean terms were often used in the same way as "race," alongside other racial classifications such as "Caucasians" and "whites and blacks." Further research is needed to fully understand the extent to which each field takes into account the political implications of using human group descriptors. However, it seems that biological anthropology is the most careful in the use of these terms—as some papers in this field explicitly problematize using racial categories—followed by population genetics. This heightened sensitivity might be due to physical anthropologists' recent self-critical reflection on their past involvement in racial science (Pak 2004; Woo 2021). On the other hand, researchers in medical genetics and forensic genetics appear to be less reflective about their not-scientifically-sound usage of their group classification.

Although the English term "race" is not used, the widespread use of "injong" and "minjok" in South Korea reinforces the biological reification of race. In response to the growing concern over "multicultural crime" (다문화범죄, "tamunhwa pŏmjoe" in Korean), which is a xenophobic expression of fears of foreigners committing crimes due to the influx of Asian migrant laborers and the rise of international marriages, forensic geneticists have conducted research on "injong/minjok identification (식별, 'shikpyŏl' written in Korean)." They have attempted to identify "Korean minjok" and distinguish it from other "Asian injong" by searching for more precise biological ancestry markers and algorithm systems, presuming biological disparities between Koreans and immigrants from other parts of Asia (Hyun 2024).

Forensic efforts made to identify the "injong" and "minjok" of criminal suspects heavily involve devising forensic DNA phenotyping. While it is recognized that identifying "injong/minjok" within Asian populations through conventional pigmentation markers is difficult, researchers are focusing on finding alternative markers. They are identifying single nucleotide polymorphisms (SNPs) related to "hair morphology" and "behavioral characteristics, such as smoking and alcohol consumption behaviors" (Seo et al. 2017). Their work has defined certain groups as biological "injong" or "minjok" possessing certain physical and behavioral characteristics. In other words, this research reifies biological race in Korean terms.

When scientific articles and R&D reports introduce "injong" and "minjok" as human group descriptors in media outlets, they contribute to the biological reification of race with those terms. The Genome Asia 100K initiative, for example, began in 2016 with the aim of creating a comprehensive pan-Asian genome database by sequencing 100,000 individuals from various Asian countries through a consortium of genome companies and academics. In South Korea, biotech company Macrogen Inc. and Seoul National University Bundang Hospital participated in the pan-Asian initiative, and the first sequencing result was reported in *Nature* in December 2019. In the English news release provided by Marcogen Inc., the implication of its publication was explained (Macrogen 2019):

> The research team performed whole-genome sequencing for a total of 1,739 individuals … The study found that the genetic diversity of the approximately 142 ethnic groups living in Asia was far greater than what was found in previous studies. On the basis of this study, it was also recognized that the Asian ethnic groups differed in terms of their response to key drugs … The research showed that Warfarin sensitivity is more likely in individuals from Korea, China, Japan, and Mongolia, as well as other persons of *North Asian descent*. (Italics added by the author.)

The news release by Macrogen Inc. was distributed to Korean newspapers, as well. In the Korean version, the terms "injong" and "jongjok" were used to translate "ethnic groups" and "descent" respectively (Lim 2019):

> The 1,739 individuals [who participated in the study were] Asians from 142 *jongjok* in 24 countries. This is the largest number of injong studied in any Asian-focused genomic research project to date. The Singaporean government-led initiative announced the completion of its [Asian] genome database including the data of 5,000 individuals but [they were] only from three injong … We discovered that Warfarin, an anticoagulant prescribed to patients with cardiovascular disease, causes serious side effects, including allergies, to *Northeast Asian injong* such as Koreans, Chinese, and Japanese." (Italics added by the author.)

Other news articles based on the same news release of Macrogen Inc. explained the implication of the research as "the inclusion of the largest number of Asian regions and *injong* in the world's publicly available Asian genomic data" and "the identification of different pharmacokinetic responses of Asian *minjok* to key medications" [italics added by the author] (Ham 2019). Again, in those articles and news reports, they do not use the English term "race," but they use "injong" and "minjok" in explaining human diversity.

Those news reports lead the South Korean public to believe that biological differences among "injong" are real. It is beyond the coverage of this chapter, but some far-right online communities use those newspapers related to genetic and genomic research on the Korean population as a biological basis to make racist and sexist arguments.[7]

7 See, for instance, "Haplogroup Gallery," DC Inside, https://gall.dcinside.com/mgallery/board/lists/?id=haplogroup. For a detailed analysis of the use of genetic knowledge for online far-right activism, see Claude Oliver Doron's chapter in this volume. See also Panofsky and Donovan (2019).

Conclusion

This chapter examined the use of human grouping categories in South Korean genetic and genomic research by carrying out a systematic literature review of South Korean scientific articles and R&D reports. It shows that, although the English term "race" has not been used since the mid-2000s, the Korean terms "injong" and "minjok" are still consistently used in South Korean papers. The "injong" and "minjok" categories are used in the same sense as "race" in those papers. This has led to the biological reification of race in forensic research and science news. Future research might need to investigate the coproductive relationship between this biological reification of race in genetic and genomic research to shape and be shaped by broader public conceptions of race and national identity in South Korea.

The South Korean experience indicates a need for decentralizing the English-centered approach in the global regulation of human grouping descriptors in genetic and genomic research. The current regulation efforts of group descriptors in genetic and genomic research are mostly American-centered, and as a result, its focus is mainly on English terms, especially "race." The most recent and influential publication in this field is a report titled "Using Population Descriptors in Genetics and Genomics Research: A New Framework for an Evolving Field" (National Academies of Sciences et al., 2023). This report was prepared by the Committee on the Use of Race, Ethnicity, and Ancestry as Population Descriptors in Genomics Research of the US National Academies of Sciences, Engineering, and Medicine (NAS) and was published by NAS in 2023. Although the report contains various useful recommendations, it also starts with the statement that "researchers should not use race as a proxy for human genetic variation" (NAS et al., 2023: 8). The South Korean case shows that racial research can be conducted in non-English settings without the use of the English term "race." If we do not consider the matter of translation in different national contexts beyond the Northern American concerns about the English term race, we will continue to overlook different forms of racial science across the globe.

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