Qualitativeassignment

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Introduction

The purpose of this paper is to reinterpret and evaluate existing archaeological debate based on the approach of scientific explanation. The target subject or the debate of this paper is about three different models explaining the starting point and origin of Upper Paleolithic period of Korea. I believe that scientific explanations, from Hempel to IBE, play a role of sieve which strains partial and biased argument as well as enable to do neutral and reasonable evaluation.

The debates of starting point and origin of Upper Paleolithic period (MIS 3-2 transition) are most problematic and popular issue in the study of Paleolithic in Korea. Some people insist that emergence of blade (32,000 BP) is the starting point while others think stemmed point (35,000 BP) indicate the start (K. Bae, 2010). And the origin of Upper Paleolithic had been regarded as coming from Shuidonggou site located in northeast China (Lee, 2013). However, this concept starts to be reconsidered. Since the dates of the similar sites in Korea were turned out be earlier than Shuidonggou (Seong, 2009). Therefore people have tried to find the new origin, and Bae and Bae divide proposed models into three different categories (C. J. Bae & Bae, 2012). First model is in situ evolutionary one which is that blade, stemmed point and other Upper Paleolithic assemblages autonomously emerged in the South of Korean peninsula. Second one is migration model. From the north, not China but Siberia, and southern China, people came to the Korean peninsula with new stone tools. Last model is trade and exchange model mixing with migration one. Once people with new technology settled down in the north part of Korea and then give their knowledge or lithics to other group (C. J. Bae & Bae, 2012).

In this project, I will analyze those three different models based on archaeological perspectives as well as approaches of scientific explanations and then evaluate the models.

The three models are introduced and supported in different articles: (1) In situ model in an article, titled, “Emergence of a blade industry and evolution of Late Paleolithic

technology in the Republic of Korea" (Seong, 2009), (2) Migration model in "Origin and pattern of the Upper Paleolithic industries in the Korean Peninsula and movement of modern human in East Asia" (K. Bae, 2010) and "The nature of the Early to Late Paleolithic transition in Korea: Current perspectives" (C. J. Bae & Bae, 2012), and (3) Combination model in "Current observations of the early Late Paleolithic in Korea" (Lee, 2013).

Even though the three authors do not mention about scientific approach in the articles, I could find some of approaches such as Hempel's unification (K. Bae, 2010), combination of plural approaches such as Samon's causality and Hempel's unification (Seong, 2009), and Lipton's IBE (Lee, 2013) in their assertions. Based on the explanations, I think Lee's combination model is the most reasonable one which explains causes of beginning of Upper Paleolithic in Korea.

Archaeological evidence

The main reason of the debates is that the related Korean archaeological records do not provide strongly perceived distinctive toolkit such as Aurignacian in Europe (Lee, 2013). Lithics, especially, blade industries are the key component of the models. Blade and micro blades and related tools such as stemmed points are regard as new technology of the period, the starting point of Upper Paleolithic, however, majority of lithics, core and flake tools, have been continuously used from the former period. Usage of raw materials, change in lithic assemblage, chronological sequence based on dating records, comparison with different excavation sites, stratigraphic aspect, genetic analysis of the Y-chromosome, and paleobathymetric variation, absence of Levallois technique are also used for building model. More specific arguments are followings:

(1) In situ model: Based on indigenous behavioral evolution, Seong asserts that the change of using blade and blade tool is viewed as slow, frequency of using the blade industries is increased, and similar pattern of making stemmed points and then microblades can be seen are indicating evolutionary processes gradually. The main mechanism of his

evolutionary background is that climate change had driven needs of new toolkits including projectile points and it causes consideration or raw materials. And due to uneven distribution of resource or quarry, hunter-gatherers' mobility and social networks were increased and it derived blade technology. Seong compares lithic assemblages of different cultural layers in one site (time difference) as well as ones of different sites and infers with the results that different aspects of layers and sites indicates high mobility. If the aspect were common and stable, then it means that hunter-gatherers had no need to move. Chronological sequence shows that there was no significant change before 40,000BP but "'gradual"' changes, producing blades could be seen between 40,000 and 30,000BP at middle cultural horizons at Hwadae-ri, Hopyeong-dong, and Youngho-dong sites and these artifact types dominate the lithic assemblages from Yongsan-dong and Gorye-ri sites. From earlier cobble and pebble-tools such as choppers and polyhedrals dominated assemblages to endscrapers, burins, and backed knives and produced from relatively high quality vein quartz, the lithic assemblages were changed gradually. Not just for kinds of tools, ratios of blade to flake, large tool to small tool, and growing reliance on blade were also gradually changed (Seong, 2009).

(2) Migration model: Bae's model is based on combination of different foraging groups emigrating from Siberia and southern China. He points out absence of continuous behavioral evolutionary transition such as from Oldowan to Acheulean. And he presents genetic studies and paleobathymetric variation. The analysis of Y-chromosomes shows relationship between modern human in Korean peninsula and in southern China. Foraging groups of southern China could easily go to Korean peninsula through route of Yellow Sea because the two regions were connected at that time. About low completeness of early blades and relating tools, he asserts that new comers might have adapted to the local environment in the Korean peninsula by adopting the conventional technology of tool production instead of retaining their own

tool making tradition of producing blades. Proper raw material takes risk and cost. And southern China also had flake-based lithic industries. He asserts that the blade technology came from Denisovan, in southwestern Siberia according to similarity of lithics with Korean blades (K. Bae, 2010).

(3) Combination model: This model can be called as migration-trade interaction model or modified version of migration model. This model was originated from errors of other models. Lee argues that new technologies were introduced in Korean peninsula but they didn't change traditional assemblages. In other words, the blade toolkits were introduced, but did not immediately replaced pre/coexisting traditional assemblage. The traditional lithic industry, or full-fledged simple core and flake tool assemblages (SCFA) seems to reoccur around 100 ka and flourish until 30ka. During the blade period, the SCFA exhibits the general characteristics without a wide range of variation within assemblage. Like Bae's assertion(K. Bae, 2010), Lee thinks that evolutionary thoery (in situ) does not make sense due to absence of any predetermined lithic strategies that require extensive preparation, such as Levallois technique. But he also questions Bae's migration theory. Because there are rugged mountains as natural barrier in Northern part of Korean peninsula so it is hard to move in from north. In addition, the blade technology in Korea is not related with Homo spience which Bae thinks as foraging groups from southern China because the age of the oldest one in Eurasia is younger than 40 ka. It means that Homo spience, modern human might arrive in Korea much later (the analysis of hominine remains is practically impossible in Korea), but blade-technology based lithics was started before the period that the modern human arrived. However, he recognizes the possibility of migration in some point and trade interaction because of existence of obsidian and Arca shells which indicate long distance mobility (Lee, 2013).

Links between evidence and behaviors

The three models explain the same phenomenon in different ways such as evolutionary theory, migration, and trade which are main frame of explanations of each model. These evolution, migration, and trade are broad range of human behavior and they contain small range of behaviors such as adaptation for surrounding environment, mobility, or subsistence pattern. Especially on this specific research period, the starting point of Upper Paleolithic (MIS 3-2 transition), the term of "modern human behavior" is frequently used to depict similar pattern of subsistence, frequent mobility, and use law material.

The authors explain the introduction of incomplete blade toolkits and coexistence with traditional assemblages as the result of modern human's ability of adaptation (evolution) (Seong, 2009) or long-distance mobility (K. Bae, 2010), or the result of combination with mobility and trade (not by modern human) (Lee, 2013). Without the common evidence of blade toolkit, Seong presents different aspect of sites and layer as evidence of mobility, effort for adaptation, and in situ development (Seong, 2009). Bae expects the migration from southern China and Siberia with generic evidence of modern human on the basis of the fact that one of main characteristic of modern human is highly mobile forager (K. Bae, 2010). Lee argues that the introduction of new technology by modern human's migration or evolution is hard to believe due to the discordance between dates of archaeological record and ones of Homo sapience. Therefore he thinks that the new technology was the results of combination of trade, some part of migration, and in situ-development based on adaptation for endemic environment of Korean peninsula (Lee, 2013). Both Seong and Lee recognize the existence of social network or mobility in Korean peninsula because of necessity of acquisition for fine-grain raw material and actual evidences such as obsidian from Mt. Baekdu, Kyushu, and Hokkaido sources (Lee, 2013).

Behavior at different scales

Human behaviors depicted in the three models can be classified in two ways: worldwide range and regional range. I already distinguished the two ranges in the former section. For example, human's evolution and migration are huge change in human history so these behaviors could belong to worldwide range or broad range of human behavior. Small range or regional range behaviors would be adaptation for surrounding environment, trade, mobility, and subsistence pattern which lead to producing the projectile points. Combination and accumulation of these behaviors could become the worldwide range, getting into Upper Paleolithic. And the evidences of the behavior could be detected in archaeological data such as use of same raw material (Lee, 2013) and genetic similarity (K. Bae, 2010).

In addition, I perceive other category of classification of human behavior which is social network. On the basis of Korean peninsula, there are two types of network could be existed: network between indigenous foragers and outsiders and one among indigenous foragers. Seong's model is closed to the latter type (Seong, 2009), Bae's to former one (K. Bae, 2010), and Lee's to combination of the two types (Lee, 2013).

Explanatory models

I do not think that Korean archaeologists explicitly employ methods of scientific explanation (SE) into their models because no clear approach of SE can be seen in their models. However, as most of archaeologists do, they use methods of SE without even recognizing them. For example, Seong's approach of the phenomenon of blade introduction seems to be influenced by Binford and Binford. They criticize typological approach like Bordes, focus on causations of assemblages and believe the difference of lithics came from certain functional reason (L. R. Binford & Binford, 1966). Seong regards that the reason of introduction of new lithic is for adaptation of changed environment which seems to explanation of causality. "Climate change drives the new lithics". But I cannot conclude that Seong's model is only based on causality or functionalism. Because he also understands the

introduction of new lithic with the worldwide range of modern human's behavior pattern, evolution which seems approach of unification (Seong, 2009).

In the beginning of this project, I expected to classify the models within Wylie's classification which divides type of explanation into three: Epistemic theory of explanation, Ontic theories of explanation, and Pragmatic or erotetic theories of explanations (Wylie, 1996). However, like Seong's approach, I can recognize plural types of explanation in one model.

Bae's migration model is quite clear to apply SE. His approach based on common sense such as "modern human had significant characteristic of long distance migration". I think the he uses the modern human's migration as "law-like" statement of Hempel and Oppenheim's (Hempel & Oppenheim, 1948) and applies this mechanism into the case of Korean Upper Paleolithic (K. Bae, 2010).

Lee's model starts with questions about other's model. For example, even though the geological condition was reasonable to migration (low sea level), but Bae's model cannot explain a question "why" people moved. And he verifies other's evidence such as dating of modern human (Lee, 2013). I think his approach is similar with Glymour's or Hanon and Kelly which stress the importance of test and verification of hypothesis (Glymour, 1980). His combination model seems to the model of Inference to the Best Explanation (IBE) which tries to provide best understanding (Lipton, 2003).

Explanatory model and relevant philosophy of science literature.

As I mentioned in the previous chapter, Salmon's causality and Hempel's DN approach, and Lipton's IBE can be seen in the three models. Here, I would like to briefly introduce these explanatory approaches based on Wylie's classification (Wylie, 1996) scrutinize the connection with three models.

Among her classification, epistemic theory of explanation is a "top-down" conception of explanation, and regarded as a function of the systematizing power of theory. It includes

models of Hempel-Oppenheim, Friedman, and Kitcher. Hempel's model, in other words, explanation by unification is the approach to explain by providing unified accounts of wide rages of phenomena. For example, a number of gas laws such as Boyle's law, Charles's law, Graham's law, etc can be explained by Newtonian physics (Salmon, 1992). Bae regards the characteristic of modern human, migration, as law (top or world-wide) and applies directly into the region (down or regional) between Korean peninsula and adjacent locations (K. Bae, 2010).

Ontic theory of explanation is a "bottom-up" approach, tries to reveal the mechanisms based on causality. Salmon's model is included in this category. Salmon (1992) illustrates that causal explanation is to explain some phenomenon with finding and mentioning its cause (Salmon, 1992). Seong's mechanism is correlation between climate change and lithics. But I think this mechanism also seems to be regarded as law-statement in study of prehistory. In addition, he also applies more apparent law, the evolution to modern human (Seong, 2009). This type of combination model is not uncommon, especially the combination of Hempel and Salmon as Seong does. It can support each limitation of the approaches (Wylie, 1996).

Pragmatic or erotetic theory of explanations is a kind of family of theories, and closed to why-question rather than law-like statement. Van Frasseen asserts that scientific explanation is not pure science but an application of science to describe certain phenomena. Therefore, it should describe and explain individual cases and should be an answer of why-question (Fraassen, 1980). From the Van Fraseen's point of view and as Lee mentioned (Lee, 2013), Bae's migration model is not reasonable because he cannot explain a lot of possibly derived questions such as "why" the modern human in southern China came to Korean peninsula (K. Bae, 2010).

In addition to Wylie's model, there is another approach, inference to the Best Explanation (IBE). This approach also points out the weakness of methods of Hempel and Salmon and focuses on individual case such as pragmatic. IBE tries to find the most reasonable explanation, called "loveliest explanation". The difference with pragmatic

approach is more deepen why question such as why P "rather than" Q. Interesting characteristic of IBE is process of testing hypothesis using the notion of foil (Lipton, 2003). As Lipton did, Lee also points out errors in other models based on archaeological evidence (Lee, 2013). Especially he focuses on the weakness of application of law or law like statement. Characteristic of modern human's migration or evolution does not perfectly make sense in the case of Korean peninsula due to discordance with dating of modern human skeleton and missing link of middle stage between previous lithic industries and blades.

Critique of three models

To tell conclusion first, I think Lee's approach is the best explanation among three models. As I mentioned in the previous section, he finds errors in application the law, evolutionary theory and modern human's migration, into case of Korea by applying or testing with new archaeological records (Lee, 2013). Salmon shows as an example of the limitation of Hempel's unification that law cannot cover some specialties of each cases of archaeology such as functional explanation in evolutionary theory (Salmon, 1992).

Except Lee's comments (Lee, 2013), in view of van Frassen (Fraassen, 1977), Seong misses the explanation why population was increased at that time despite of severe climate change or the explanation of sequence in his causal mechanism, so his adaption model is hard to accept (Seong, 2009). In addition, in view of Lipton (Lipton, 2003), Bae cannot explain why (or how) the indigenous people in Korea accepted the new lithic rather than refusing to use (K. Bae, 2010). However, as Barnes asserts, I cannot judge whether Lee's loveliness explanation is the best one or not (Barnes, 1995). But, then who knows the truth authentically? I think the main role of archaeologist is pursuing most reasonable explanation with continuously updated data. And based on current archaeological records, Lee's combination model is the best and it also can be denied or replaced in future.

Conclusion

The main task of this project is to reinterpret and evaluate three models depicting starting point of Upper Paleolithic in Korean peninsula. Each model has proper archaeological evidences and reflects human behaviors in different scales. Even though, the authors seem not recognize the approaches of scientific explanation, they still use the scientific approach under influence of reading archaeologists, Renfrew and Binford. I could succeed to find several kinds of scientific explanations in their models and could evaluate each model.

As a result, I think that Lee's combination model is reasonable to describe the period. Again, I do not know whether he considered the scientific explanation as frame of his model or not, his approach is quite reasonable. Testing (other's) hypotheses and recognizing foils of them are important points to evaluate as well as to build a model.

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