

## Psychological Dynamics of Forming Cognitive Map Arabic Translation in Student

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### ABSTRACT

The translation is a cognitive activity, while humans, as cognitive subjects, have different ways of thinking. This condition has implications for the difference in translation results; infrequently, the translation results need to be clarified for the reader. Therefore, an investigation into the problems of learning Arabic needs to be carried out to minimize the emergence of a generation of incompetent Arabic translators. This study aims to investigate the psychological dynamics that occur in a person to cause differences in the way of thinking in Arabic translation. This research is qualitative research using a multi-case approach. The research subjects consisted of 10 Nurul Ummah students as a single-case analysis and 4 LSQ Ar-Rohmah students as a cross-case analysis. The data collection technique used interviews and documentation to assess translated results by expert Arab-Indo translators. Data processing to data visualization implemented NVivo 12 Plus analyzing the suitability of patterns between single and cross-case cases by synchronizing interview transcription results and translated values. The results of the data analysis found several problems that caused differences in the way of thinking of participants in Arabic translation. First, the difference in the weak structural representation of *nahwu-shorof* due to the difference in the age of knowledge acquisition, the number of activities participated in by participants, and the selection of the priority scale of selected activities; second, differences in inferential planning accuracy due to differences in participant habituation in Arabic translation.

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## INTRODUCTION

The thought process in translation is part of human cognitive abilities. Rojo (2015) expressly stated that translation is a cognitive task. The emphasis on cognitive aspects in translation lies in the thought process of capturing the meaning of the source text and restructuring it into the target language (Vyacheslavovna, 2018). These two cognitive activities that attempt to establish the meaning of the source text and simultaneously reformulate it into the target language are called dual cognitive activities (Ren & Wu, 2015).

The existence of multiple cognitive activities in the translation process imposes higher cognitive demands on the translator. These demands arise from the fact that a translator is a leading actor in the translation process (Ren & Wu, 2015). In addition, translation is a human communicative action between the original author and the reader. Due to the important role of a translator, Yi (2020) asserted that a translator must be required to provide the best relevance to readers by attempting to produce translations that genuinely reflect the intent of the original text.

The translation results are representations of one's knowledge and experience. Errors in systematics or ways of thinking in translation can result in translation results that deviate from the intention of the author of the original text or even complicate understanding the reader of the translated result. However, the results of translations between one person and another must be different. Ren (2015) stated that humans, as cognitive subjects, have different ways of thinking.

Differences in translation results are inevitable, but tolerance can still be given if the quality is good. On the other hand, if there is a translation with poor quality that has implications for the confusion of understanding the target language reader, then it needs to be considered. Therefore, it is necessary to have research that investigates the problems of the Arabic learning process to minimize Arabic translation errors in the next generation and produce competent Arabic translators. This study aims to examine the psychological dynamics that occur in a person to give rise to differences in the way of thinking in Arabic translation.

### **Cognitive Map, Cognitive Translation, and Arabic Translation Learning**

The discussion on the construction of knowledge and experience in a person is related to the debate on the role of the brain in mapping and organizing various knowledge and experiences, known as cognitive maps. Cognitive map theory was introduced by Tolman (1948) to term a map in the mind that is formed from building the nervous system into a concept, organizing concepts from one concept to another to predict various possibilities and determine decisions.

Cognitive map theory attracts the attention of further researchers to develop this theory by integrating it into various fields. First, the development of cognitive map theory in physical or geographic scope. Research with this category includes

those that examine the function of cognitive maps in navigating geographical space (Ishikawa et al., 2008; Guelton, 2019; Bostelmann et al., 2020), and several others examine cognitive maps by investigating the parts of the brain that regulate this navigation process (McNaughton et al., 2006; Boccara et al., 2019; Woollett & Maguire, 2012). Second, it relates to the development of cognitive map theory in abstract or conceptual scope. Research in this category is based on the argument that Tolman's original cognitive map concept can be extended to various conceptual/abstract domains in human life. Some of the studies include studying cognitive maps in piano tuning (Teki et al., 2012), clinical handover activities (Flemming et al., 2015), organizing various circumstances (Zeithamova et al., 2012; Schiller et al., 2015), and problem-solving and decision-making activities (Eden, 2004; Lee & Kwon, 2014; Park et al., 2020; Bokeria et al., 2021).

Based on the literature review with the theme of the cognitive map as mentioned above, no research integrates the cognitive map with thinking processes in translation, especially in the Arabic language. The reasons researchers associate cognitive maps with translation include: first, language skills cannot be separated from cognitive aspects, and human experience, as well as human experience and cognition, must precede translation abilities (Ren, 2015). On the other hand, cognitive maps result from mapping knowledge and life experiences, organizing these experiences systematically (Schiller et al., 2015), and solving relevant problems (Eden, 2004). Based on these reasons, the researcher believes that the thinking process mechanism in translation results from the knowledge of the language and the individual's experience in translating the related language. It conveys the importance of studying the translation process using a cognitive perspective with cognitive map theory.

Furthermore, the reasons for choosing Arabic as the object of research for translation studies here include the following: First, Muslims in Indonesia are ranked in the survey as the largest Muslim population in the world (RISSC, 2021), while the fundamental teachings of Islam are the Qur'an and Arabic hadith. Errors in the translation of Arabic will cause partial, shallow, and formal knowledge obtained, as they are the case with radicalism; one of which is the mistranslated and interpretation of the Qur'an verses (Munip, 2017; Zuhdi, 2017). Second, the perception of Arabic learners in Indonesia leads to the impression that it is difficult to learn Arabic compared to other foreign languages, such as English (Munip, 2019; Nur, 2018). This difficulty is due to the more complicated grammar and *uslub* system of Arabic than other languages (Rozak, 2018).

The development of translation studies has shifted from initially focusing on translation results to focusing on the process using a psychological approach, especially the cognitive aspect. Various studies with the theme of cognitive translation have developed starting from the role of cognition in translation (Rojo, 2015; Daems et al., 2017), elaborating the theoretical foundations of cognitive translation studies (Deckert, 2017; Holubenko & Demetskaya, 2020;

Vyacheslavovna, 2018; Yi, 2020), analyzing the empirical development of translation research with an experimental perspective and a cognitive perspective (Extremera, 2015; Hurtado Albir, Alves, Englund Dimitrova, & Lacruz, 2015; Krüger, 2016), and developing cognitive approaches in translation learning (Ren, 2015; Ren & Wu, 2015). Thus, this research not only contributes to the development of cognitive map theory but also to the development of cognitive translation studies which is an interdisciplinary study between psychology and translation.

O'Brien (2013) stated that the scope of cognitive translation studies is not only focused on the process of one's cognitive activity when translating but also examines how environmental and social factors influence decision-making in the translation process. Therefore, this study aims to investigate a person's learning process in constructing Arabic knowledge and their experience in Arabic translation to explore the effect on their different ways of thinking in Arabic translation more deeply.

### **Cognitive Map Components: Structural Representation, Systematic**

Structural representation, systematic knowledge organization, and inferential planning are the components that establish a cognitive map that navigates a person's thought process (Behrens et al., 2018). Structural representation is an understanding or knowledge stored in the brain's memory that is obtained through marking an object or coding the characteristics, specifications, or entities of an object. Structural representation involves the role of brain memory in remembering sequences of events (Schiller et al., 2015) and encoding the identity and entity of an object (Hsieh et al., 2014). Structural representations are formed from the many experiences of individuals in dealing with a problem or task so that a structured schema/abstraction is formed in the brain that is useful in finding more efficient solutions in the future.

The learning process to strengthen the structural representation of students can be done by providing assignments containing an object's identity at random. In contrast, the relationship between objects appears constant. The more experience and knowledge an individual possesses, the stronger and more generalized the structural representation will be, even though the experience gained is achieved from simple principles.

The systematic organization of knowledge guides the mind in integrating various structural representations and providing boundaries for the identity of objects and concrete actions to be combined (Behrens et al., 2018). The scheme of the systematic organization of knowledge in the human brain is revealed by Grewe et al. (2017) mentioned that the representation of the relationship between objects could be known through coding in synaptic weights. A person in a situation can easily imagine a scenario or structural abstraction in which cells in the brain form the representation of object X, then form new synaptic connections with cells that

make up the representation of object Y and are reconnected with cells that create the representation of object Z and so on until a complex knowledge organization is formed.

Inferential planning is a cognitive activity in predicting the possibility that will occur and determining the selected behavior based on the results of the analysis by organizing existing knowledge. Establishing inferential planning in individuals involves the role of the brain in the hippocampus. Buckner and Carrol (2007) in their research stated that cells in the hippocampus become active during retrieval of the identity coding and characteristics of an object (reconstructive memory), as well as when individuals develop and imagine new problem-solving plans (constructive imagination) with elaboration on the previously obtained structural abstraction. Epstein et al. (2017) also said that cognitive maps involve the brain in considering future planning using past representations. Hassabis (2007), in his research, strengthened these two types of thinking activities by stating that without the role of the hippocampus, the two phases cannot be executed by individuals in building and imagining future problem-solving. However, Behrens et al. (2018) stated that inference and generalization are more appropriate to use in cognitive maps than just planning.

Based on the theoretical study above, the three components that establish the cognitive map are used as the basis for preparing research questions. How is the process of constructing knowledge and experience in a person so they can form a structural representation of Arabic translation in the brain? What is the process of constructing translation knowledge for someone to organize relevant knowledge in Arabic translation? How does the difference in the construction process of translation knowledge make people obtain different thinking patterns in Arabic translation and translation results?

## **METHODS**

This qualitative research uses a multi-case approach because each participant has a unique case different from others regarding problems in constructing Arabic translation knowledge. The participants in this study were 14 people; 13 were students at Islamic boarding schools. They were active as students at several universities in Yogyakarta, and 1 other participant was a non-student student (not studying at a university). The selection of participants was based on two criteria: students at Islamic boarding schools whose learning concentration leads to intensive Arabic translation activities (at least 2-3 times a week). Participants are students in the upper class at Islamic boarding schools that apply classically or students who have lived in the cottage for more than 4 years. The reason for establishing this characteristic is to ensure that the students have mastered the Arabic translation.

The primary data source in the study was the expression of participants related to the experience of the Arabic translation learning process they experienced. In

contrast, the secondary data source was participant translation scores with assessment criteria of A (perfect), B (Good), C (enough), D (Bad), and E (very bad). The interview instrument was arranged based on the three components that make up the cognitive map. Concerning the imperious Arabic text distributed to participants, the researcher applied two criteria, namely, Arabic texts that do not contain high-level literary elements so as not to make it challenging to translate participants. The text was taken from a study book that has not been translated (has not been translated by experts/academics and has not been published). It is therefore expected to be able to explore the authentication of participant translation results. In the end, the researcher took a sample of the Arabic text from the book of *Nailul Marom*, a book of Islamic studies containing a collection of the hadith of the Prophet, and equipped it with a more detailed explanation of the meaning of the hadith. The Arabic text chosen was the Prophet's hadith about an *a'raby* urinating in a mosque, along with a description of the implicit meaning taken from the hadith.

Data collection techniques used interviews and documentation of translated results. In collecting data, research researchers applied procedures including asking for participant approval as stated in and validation of Arabic translation experts. Informed consent contains a statement of participant consent regarding the willingness to conduct interviews, audio recordings, and the willingness to translate the Arabic text provided. Expert validation of Arabic translation was used to assess the feasibility of translating Arabic text to participants and assess participant translation results. The expert translator in this study is Ahmad Wahyudi. He is an alumnus of Al-Imam Muhammad Ibn Saud Islamic University and has had a career in Arabic translation for over three years.

The data analysis procedure in this study used pattern-matching techniques and explanatory making. This study used the multi-case design of Yin (2013) so that the analysis strategy was applied both in single-case analysis (Nurul Ummah participants) and cross-case analysis (LSQ Ar-Rohmah participants). Starting with importing interview transcript data and participant translation values into NVivo 12 Plus, then providing code and cases on interview transcript data and attribute values on participant translation value data. The next step was to create a visualization of relevant data based on participant expressions, both explicit and implicit. In addition to visualizations, crosstab-query result tables were used in certain themes to support explanations of previous data visualizations (if needed). The final step was to compile the systematics of presenting data. The systematics of the presentation was based on a multi-case design, presenting the results of single case analysis on Nurul Ummah students along with their conclusions, presenting the results of cross-case analysis on LSQ Ar-Rohmah students along with their conclusions, and finally drawing conclusions of the research. Figure 1 illustrates the visualization of the following research design chart.

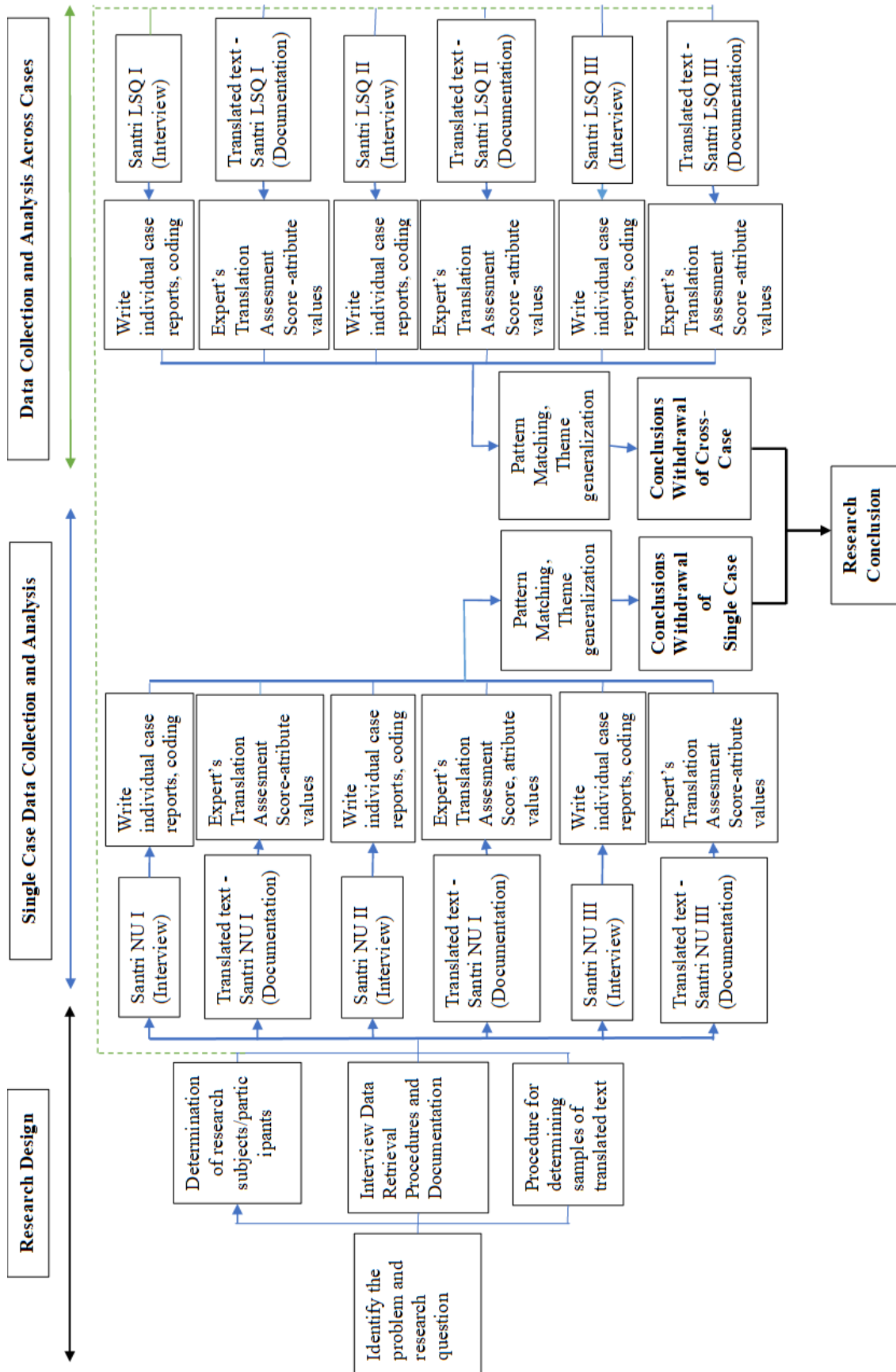


Figure 1. Multi-case research design

Validity in this study used data triangulation of coherence of interview data, and different participant translation value documents present variations of participant expression data that vary and utilize explanation to create rich and concise descriptions still based on the theoretical proposition of cognitive map. The questioning approach is used to dig deeper into the data and the analysis results (Cresswell, 2016). The reliability of this study is to check the data and the results of data analysis repeatedly and with full accuracy. Preventing to increase in the reliability of results began with checking the transcription results of each case in participants. It repeated checks on nodes made in the coding process at the first and second-cycle coding stages.

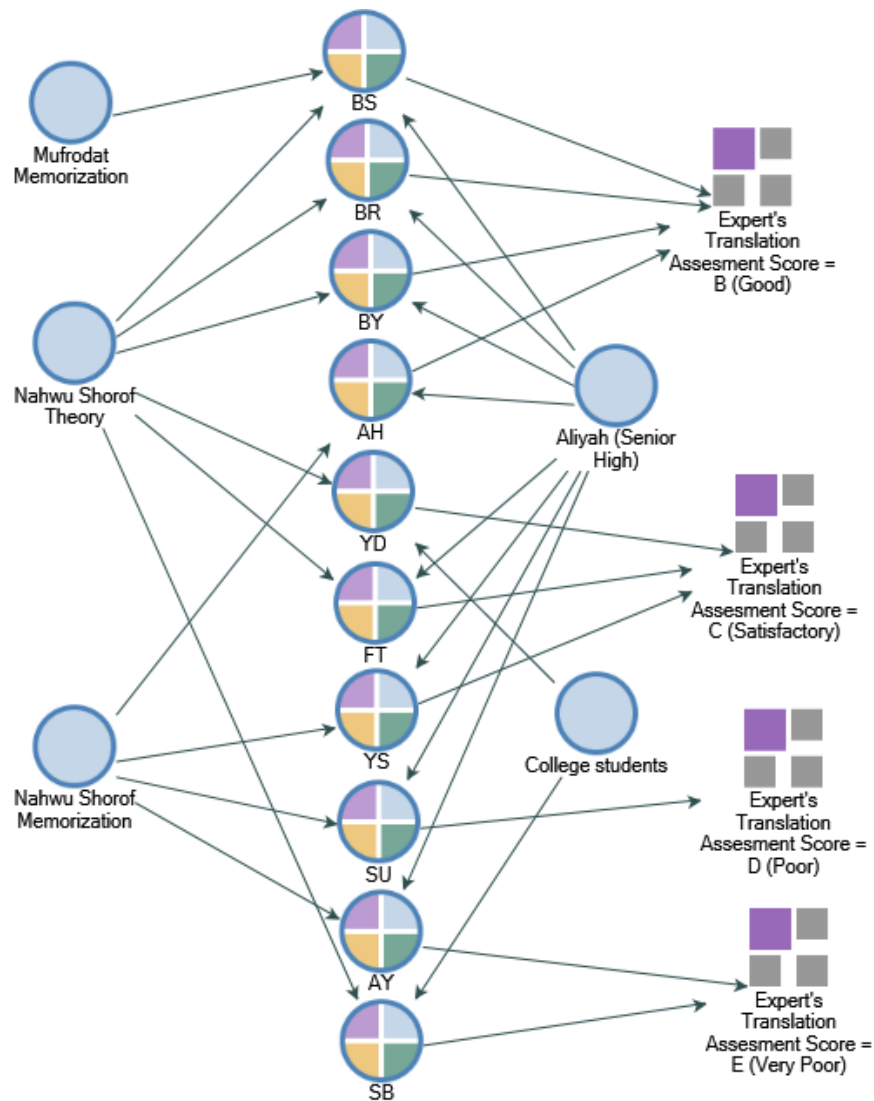
## RESULTS AND DISCUSSION

The pattern between single-case analysis and cross-case analysis yielded several findings, such as that age differences in the acquisition of early knowledge of *nahwu* and *shorof* affected the difference in the strength or weakness of structural representations of *nahwu* and *shorof*, which is formed. In addition to initial knowledge, differences in the number of activities participated in by each participant and the selection of priority scales of activities affect differences in solid or weak structural representation and differences in the ability to organize knowledge in translation. The determining factor for the difference in the way of thinking in translation is the presence or absence of one's habituation. This habituation factor affects inferential planning schemes and impacts the difference in one's translation results with others.

### The Beginning of *Nahwu* and *Shorof* Knowledge Acquisition

The translation process involves some knowledge that a person must possess. Even more so when one is about to translate Arabic, analyzing the Arabic text at least involves the knowledge of *nahwu* and *shorof*. The analysis of interviews with Nurul Ummah participants showed that they had studied *nahwu* and *shorof*. *Nahwu* knowledge is used to analyze *tarkib*, while *shorof* is used to analyze the meaning of each corresponding word. However, there are differences in the level of education the first time they learn both knowledges. These differences are then associated with the participants' translation results and produce visualizations in the following chart.



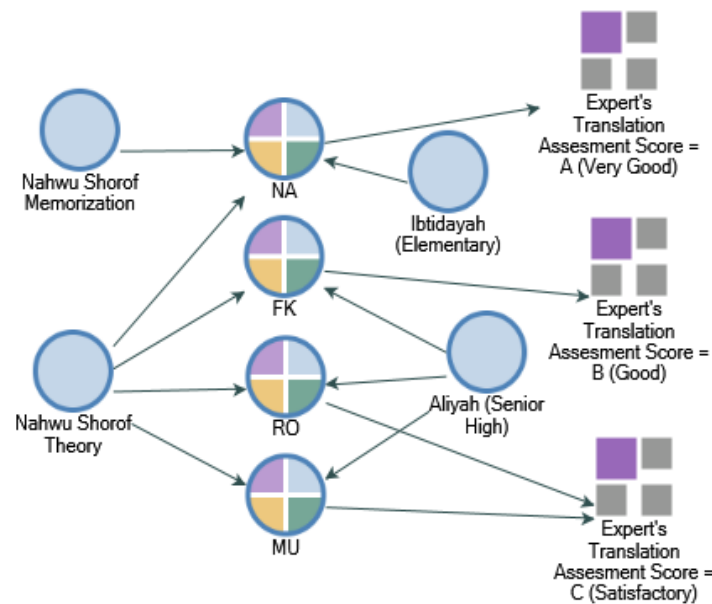


**Figure 2.** The beginning of the acquisition of *nahwu* and *shorof* knowledge and its implications for the acquisition of the translation value of Nurul Ummah students

Figure 2 shows the results of the pattern-matching analysis where all Nurul Ummah participants know *nahwu* and *shorof*. However, when viewed from the initial aspect, they studied *nahwu* and *shorof* -which represent educational levels- and are connected with the translation results of participants at the time of this study. The results obtained differences in their translations' value and formed a pattern. In the first pattern, participants who began to learn *nahwu* and *shorof* grammatical at the high school /*aliyah* level received varied translation scores. BS, BR, BY, and AH participants got B grades, FT and YS participants got C grades, SU participants got D grades, and AY participants got E grades. In the second pattern, participants who studied *nahwu* and *shorof* grammatical at the college level got C grades from YD participants and E grades from SB participants.

The highest translation value in the first pattern is a B grade, while the highest in the second pattern is a C. Although some participants scored C, D, and E, the cases of participants who scored low were relatively few. Other corroborating evidence can be seen in the case of participants who gained initial knowledge of *nahwu* and *shorof* at the tertiary level, getting a C grade.

Furthermore, the results of the cross-case analysis of LSQ Ar-Rohmah participants' expressions are presented regarding the acquisition of initial knowledge about *nahwu* and *shorof* and the development of Arabic translation skills of the following visualizations.



**Figure 3.** The beginning of the acquisition of *nahwu* and *shorof* knowledge and its implications for acquiring the translation value of LSQ Ar-Rohmah students.

Figure 2 shows that all participants already have *nahwu shorof* knowledge. In the cross-case analysis of LSQ Ar-Rohmah participants, there are two patterns: the acquisition of initial knowledge of *nahwu* and *shorof* at the *ibtidaiyah* or elementary and high school levels. The first pattern produced an A (excellent) translation grade in NA participants. The second pattern resulted in a translation value of B in FI participants. In contrast, the other two participants, RO and MU, scored C. Thus, the results of pattern matching analysis in the cross-case analysis showed that early knowledge acquisition at the elementary school level had a better translation value than acquisition at the high school level.

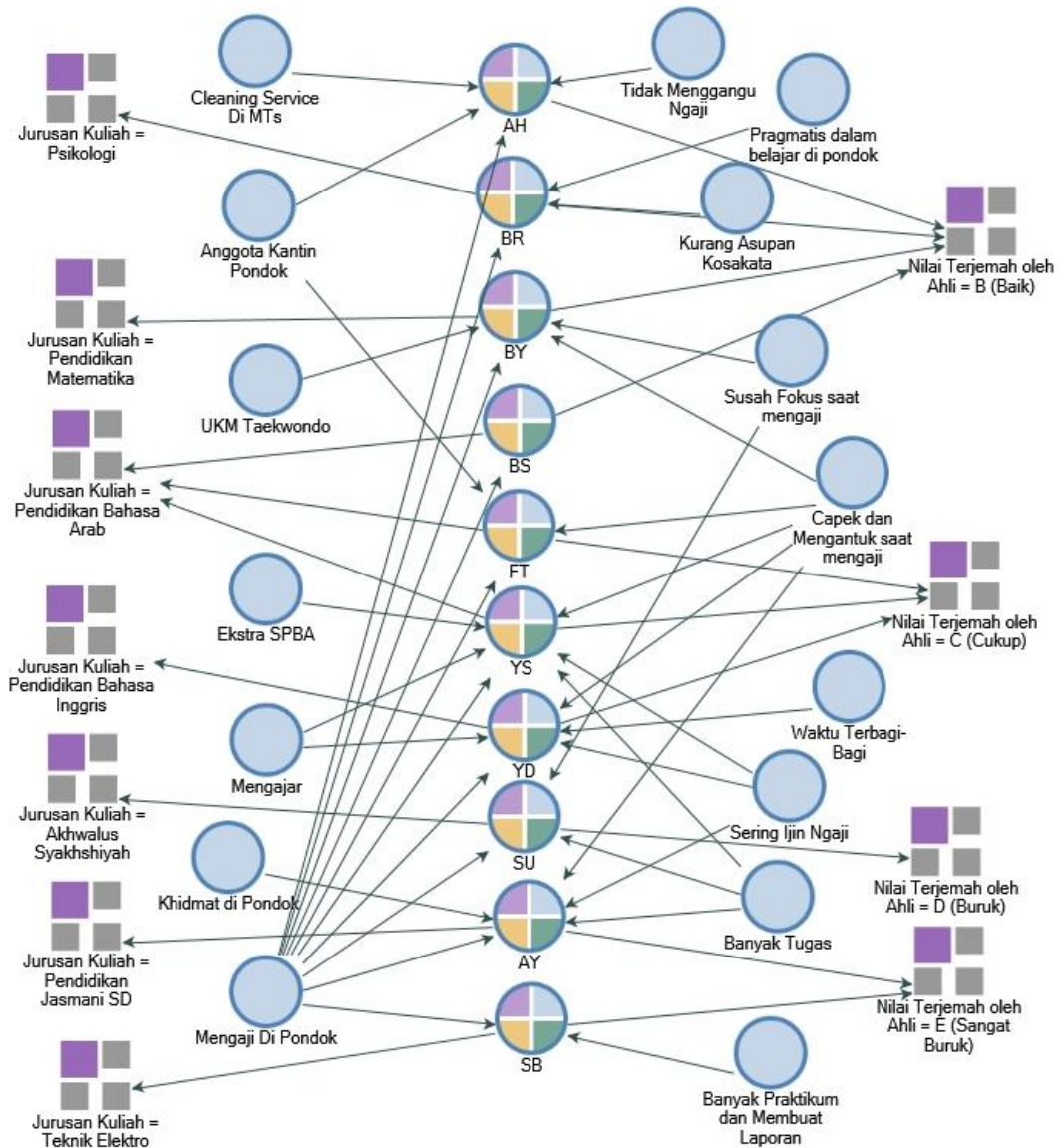
### Problems of Developing Translation Skills

Translation ability is not only influenced by a person's age when acquiring initial knowledge of *nahwu* and *shorof*. However, it is related to various problems they face in the subsequent learning process, namely developing this knowledge into the ability to translate Arabic texts. The results of the analysis of participant

expressions indicate two problems: the number of routines or activities they carry out and the selection of the priority scale of these activities.

### 1. Activities and Their Influence on the Development of Translation Skills

Most participants, both Nurul Ummah students and LSQ Ar-Rohmah students, are active as students at universities in Yogyakarta. Some other participants had additional activities outside of studying at the cottage and lecture activities at the university. Figure 4 explains the results of the single case analysis of Nurul Ummah participants in the following chart.

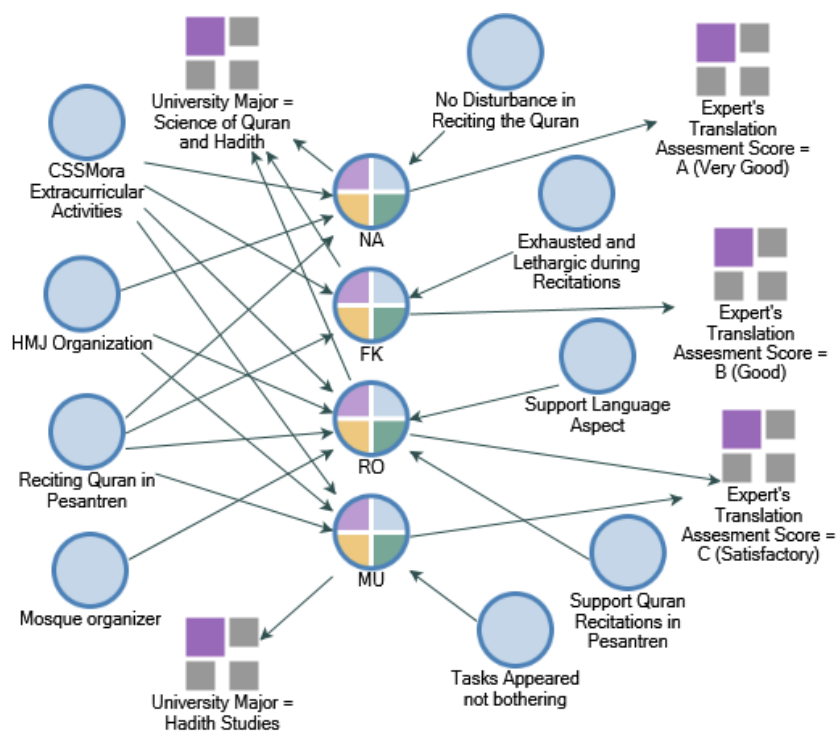


**Figure 4.** The number of activities and their influence on the transition value of Nurul Ummah students.

The results of a single case analysis of Nurul Ummah participants showed that some of the problems that interfered with developing translation skills came from activities in lectures and other activities besides studying at the cottage.

The most meaningful activity is lecture activities. AH, participants who obtained a B grade had other activities, becoming a cleaning service in a school and a canteen member. Still, these activities did not interfere with studying at the cottage. Unlike the SB participants who got an E, the routine was to study and go to college. One of the factors is that the college major is not linear. There are many tasks in practicum and making reports. The other participants experienced fatigue and drowsiness when studying because of the many tasks in the lecture and other activities, which demanded a division of time.

The next step is to conduct a cross-case analysis of student participants at LSQ Ar-Rohmah. Figure 5 presents a visualization of the data processing results on the influence of many activities in developing Arabic translation skills.



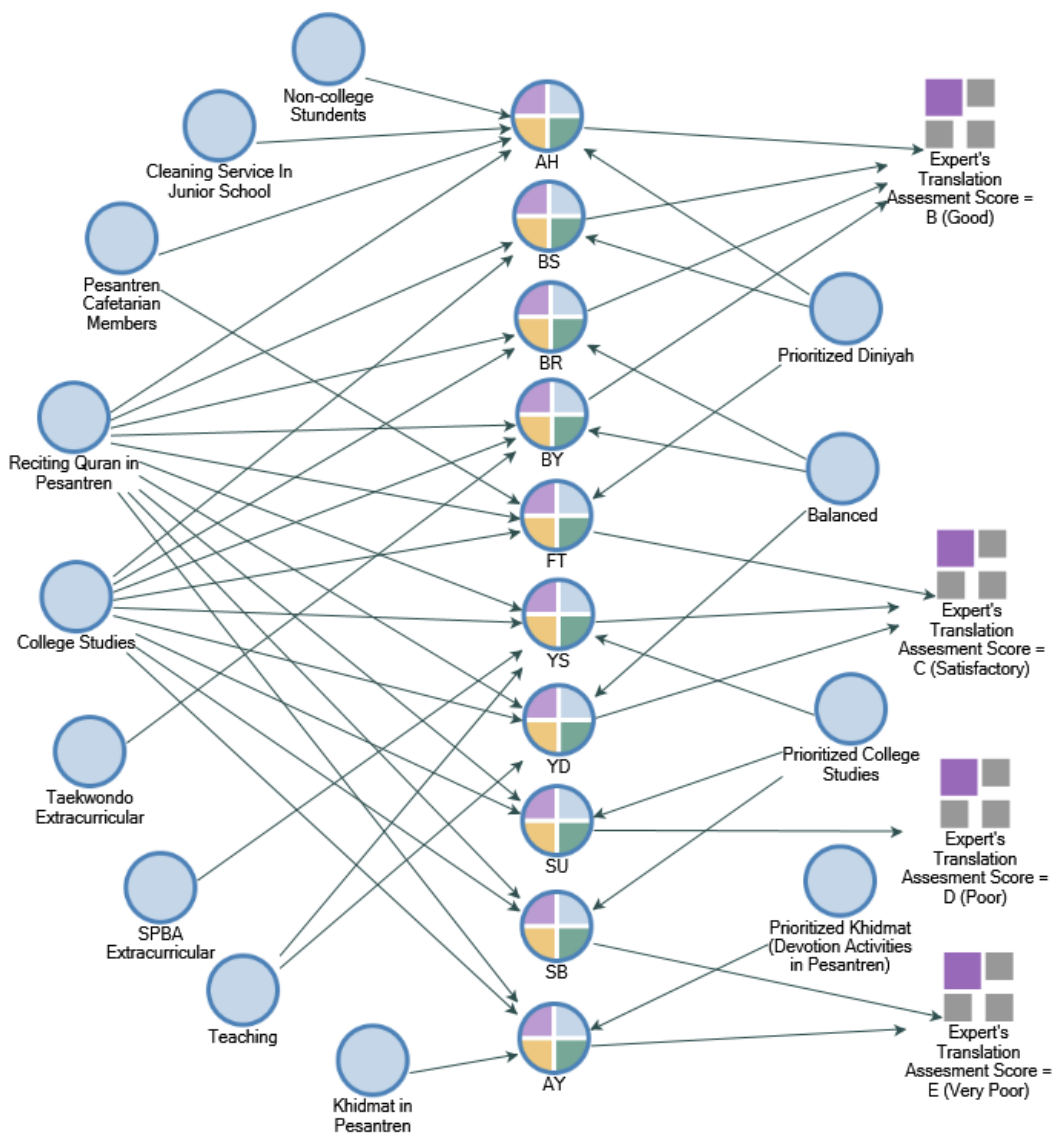
**Figure 5.** The importance of activities and their influence on the translation value of LSQ Ar-Rohmah students

Figure 4 above shows that the activities participated by LSQ Ar-Rohmah participants were more than those of Nurul Ummah participants. The results of the cross-case analysis show that actions in lectures and other activities other than studying in the cottage affect the development of translation skills. Figure 4 illustrates that the more activities participants participate in, the lower the translation value. For example, RO and MU participants with a C translation score had more activities than FI participants. Unlike the case with NA participants who got an A. Although the number of activities in NA participants is the same as in MU participants, NA has a more substantial initial knowledge of *nahwu* and *shorof* than MU, as shown in Figure 2.

The pattern matchmaking between the single-case analysis and the cross-case analysis showed that activities joined by the participants influenced their lack of attention or loss of concentration due to fatigue, drowsiness, and coursework required. They do not have much time to study independently, repeat previous subject matter, or develop their Arabic knowledge, leading to lacking translation skills.

## 2. Priority Scale Selection

This section is a continuation of the previous analysis of the many activities participated by participants. There was one of the activities they prioritized. When connected with translation value data, it shows a single case analysis of Nurul Ummah participants.

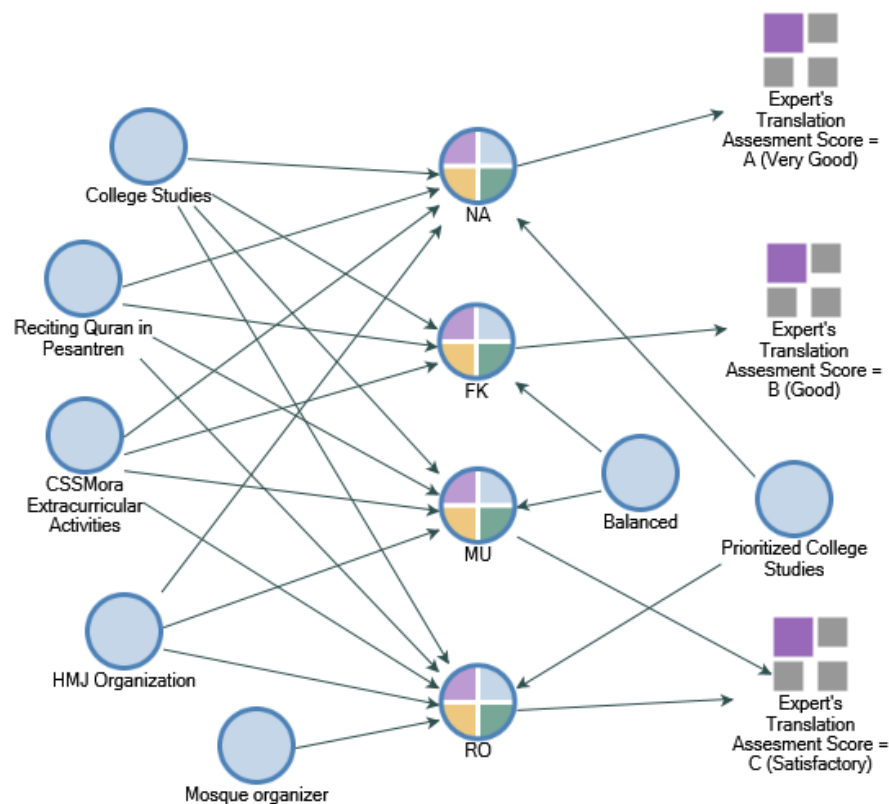


**Figure 6.** Selection of priority activities and their influence on the translation value of Nurul Ummah students

Based on Figure 6, participants who prioritize studying in the cottage impact translation value B in AH and BS participants and C value in FT participants. Balanced priority affects translation value B in BR and BY participants and C in YD participants. The emphasis of the lecture has an impact on obtaining a translation grade of C in YS participants, D grades in SU participants, and E grades in SB participants, while priorities on activities outside of lectures and studying at the cottage have an impact on obtaining E translation values in AY participants.

In this case, there is a similar pattern between choosing the priority of studying in the cottage and choosing balanced, namely more participants who get a translation score B. Selection of *diniyah* priority means that participants focus more on developing Arabic translation skills. In contrast, other activities do not get much attention. Similarly, participants who chose to be balanced still took the time to develop their Arabic translation skills even though they did many routines. Unlike the participants who prioritize lectures or other activities, in this case, the development of Arabic translation skills does not receive much attention, so the translation scores they get are at the C, D, and E levels.

Furthermore, the analysis of priority selection in LSQ Ar-Rohmah student participants is a cross-case analysis. Data analysis of participant expressions and translation values are contained in the data visualization.



**Figure 7.** Selection of priority activities and their influence on the translation value of LSQ Ar-Rohmah students

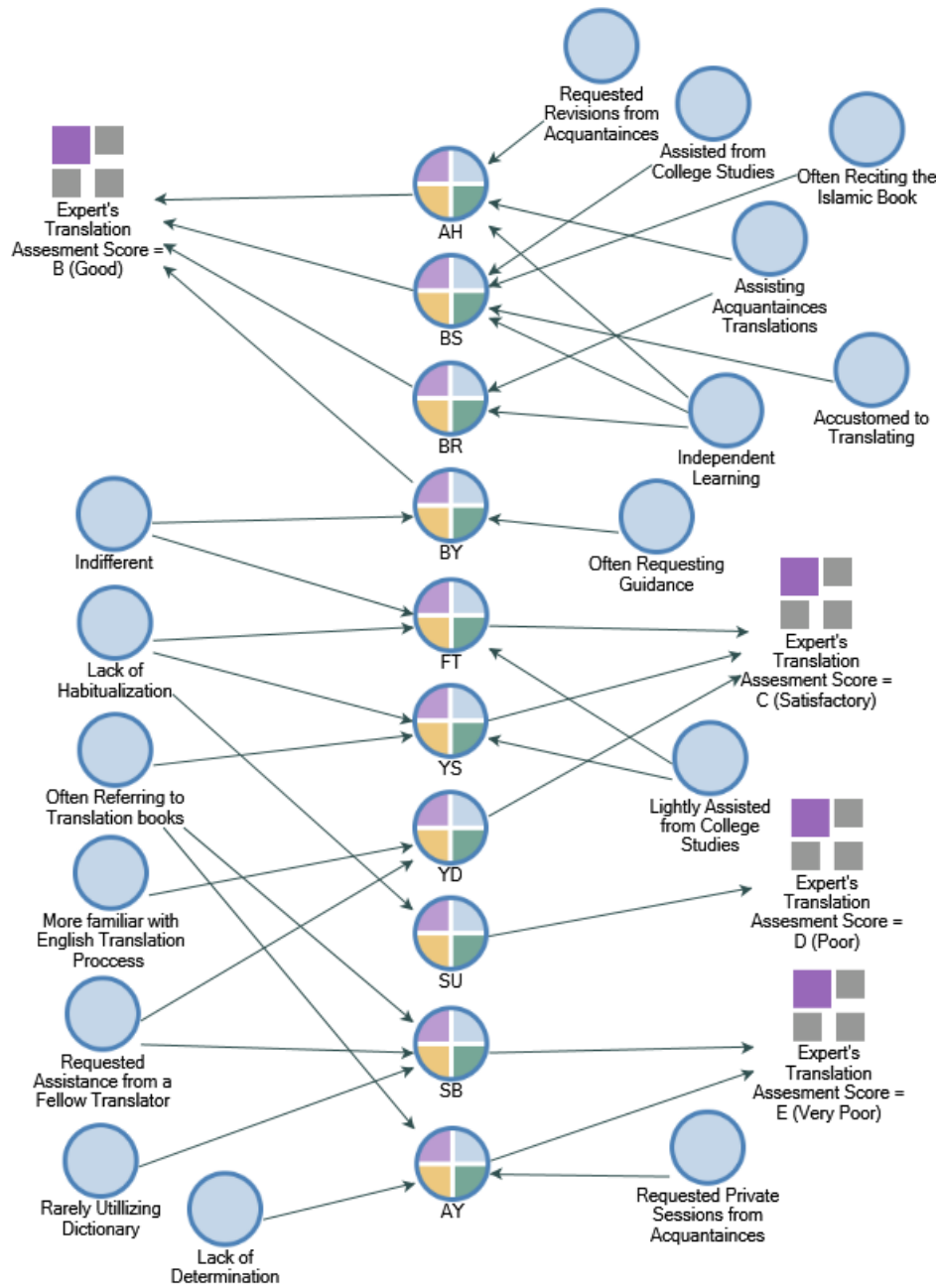
In the cross-case analysis visualization above, there are two patterns of selection of activity priorities, namely lecture priorities and balanced elections. The first pattern impacts obtaining the translated value A in the NA participant and the C value in the RO participant. In contrast, the second pattern affects the acquisition of the translation value B in the FI participant and C in the MU participant. In this cross-case analysis, participants with college priorities were superior to participants who chose to be balanced.

There are differences in the lecture priority selection patterns between single-case and cross-case analysis. In a single case analysis, the college priority selection got the highest translation grade of C. In contrast, in the cross-case study, the highest translation grade was an A and the highest grade of all participants. This pattern difference can be broken down by linking the results of the first analysis, namely the beginning of the acquisition of *nahwu* and *shorof* knowledge. NA, one of the participants, had gained knowledge of *nahwu* and *shorof* at the elementary school level, more precisely during the 4th grade of elementary school. Thus, NA participants are not affected by many activities and priority selection.

In addition to the cases in NA participants, there was a similarity in pattern between the analysis of the cases in Nurul Ummah participants and the cross-case analysis of LSQ Ar-Rohmah participants. Therefore, the result of the analysis in this section is the influence of the selection of priority scales of various activities in developing Arabic translation skills.

### **Habituation in Arabic Translation**

Arabic translation skills are related to the acquisition of *nahwu* and *shorof* knowledge and the habituating a person to deal with Arabic texts and translate them into Indonesian. Figure 8 presents a visualization of the results of a single case analysis of Nurul Ummah participants about translation habituation and its effect on translation value.

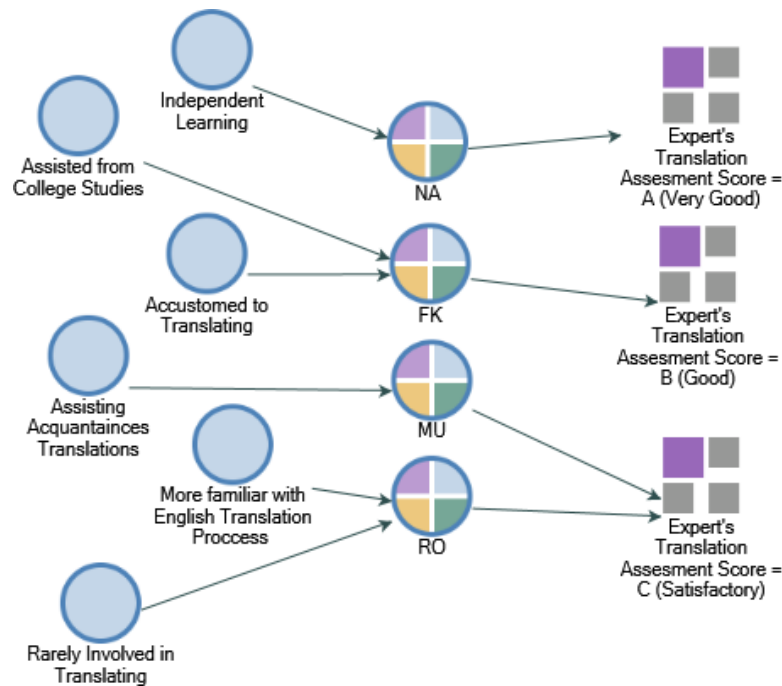


**Figure 8.** The effect of translation habituation on Arabic translation skills in Nurul Ummah participants

The analysis results of single cases in Nurul Ummah participants had two patterns: habituation and lack of habituation. The first pattern was found in AH, BS, and BR participants who received translation scores of B. They were often accustomed to Arabic text translation activities, self-study, and helping their friends and juniors in the cottage. The second pattern was that other participants got grades of C, D, and E. The most causal factor was the lack of habituation in translating Arabic texts, while the other factor arose from seeing frequently translated books and rarely opening dictionaries due to laziness.



The next step is to conduct a cross-case analysis of LSQ Ar-Rohmah participants. Based on the expressions of the LSQ Ar-Rohmah participants, Figure 9 presents a visualization associated with the value of translation by an Arabic translator.



**Figure 9.** The effect of translation habituation on Arabic translation skills in LSQ Ar-Rohmah participants

The results of the cross-case analysis of LSQ Ar-Rohmah participants showed that A and B grades were obtained by participants who had the habit of translating Arabic texts independently. Unlike the participants who got a C grade, they were less used to translating Arabic texts.

Thus, there is a similarity in pattern between the results of single-case analysis and cross-case analysis where the presence in the translation of Arabic texts can improve their translation skills. Conversely, the lack of habituation to Arabic text translation will hinder the development of translation skills. Habituation of Arabic text translation will strengthen *nahwu* and *shorof* knowledge so that the accuracy of the Arabic text analysis results is more precise than that of participants who lack habituation. Translation habituation can also improve the ability to organize knowledge to capture the meaning of Arabic texts and choose the proper diction so that the translation results are better than participants who lack habituation.

### The Urgency of Strengthening *Nahwu* and *Shorof* Structural Representations Early

In the context of this study, Arabic translation skills in participants are passive Arabic translation skills obtained through language *learning*. On the other hand, Arabic is the source language because the original translated text is written in

Arabic. At the same time, Indonesian is the target language because the translation results are documented in Indonesian. One can translate Arabic from the grammatical learning process of Arabic as a second language and the source language.

The conclusion of the pattern matching results between the single-case analysis (Figure 1) and the results of the cross-case analysis (Figure 2) shows that the earlier a person acquires initial knowledge of *nahwu shorof*, the better the translation value. When studied using cognitive development theory, the position of participants when they first learned Arabic was divided into two, namely the concrete operational stage and the formal operational stage.

In the concrete operational stage, the dominance of children's thinking ability is in coding or marking the identity and entity of an object, giving names, sorting things according to shape, and other thought processes to think about solving problems. The designation of an object or coding on an object's characteristics, specifications, or entities in Behrens's is referred to as a structural representation.

In other words, the concrete operational stage is the right time to reproduce the coding of various terms in the study of *nahwu* and *shorof* and their identities and strengthen the structural representation of *nahwu* and *shorof* through the enrichment of tasks and applications in the reading of the book when these two things continue to be done until they are at the formal operational stage, where a person's cognitive abilities are already at the level of thinking abstractly. Logical reasoning to conclude will lead to better translations.

Unlike the case of participants who have learned Arabic at the formal operational stage, they can still master the grammatical Arabic and other supporting sciences, the structural representation that he brings in translation is not as strong as that of people who have studied Arabic grammatical since childhood/concrete operational stages because it should no longer focus on forming structural representations of *nahwu shorof*, but instead on developing the ability to think logically in analyzing Arabic texts and drawing conclusions by restructuring translated sentences. Epstein et al. (2017) stated that "route planning involves considering the future using representations laid down in the past." The statement indicates that the cognitive map, which in this case is termed "route planning" in the future, requires a strong structural representation of the past, and to strengthen the structural model is to introduce it to students from childhood.

Thus, the earlier one learns *nahwu* and *shorof*, the stronger the structural representation formed and the better the translation. As Bostelman (2020) examined children's ability to use pathway integration to the home and builds mental maps that support navigation in their environment, childhood is an excellent time to instill cognitive maps. The test results found that children can use pathway integration without visual information to create cognitive maps, and children's cognitive mapping capacity can increase with age. Indeed, the cognitive map of Arabic translation in 9-year-olds has yet to be seen.

Newcombe's research also conveyed that the cognitive map results formed in children were not visible until they reached the age of 12 years.

Now, what is the solution for those who start learning Arabic, especially *nahwu* and *shorof*, at the high school level? or even the college level, where they have more activities that have the potential to interfere with Arabic learning? The answer to such a question leads to the following discussion.

### **The Urgency of Choosing a Priority Scale from Various Routines Carried Out**

The results of pattern matching between single-case analysis (figure 3) and cross-case analysis (figure 4) show that the more activities participants participate in outside of Arabic learning activities, the more impact it has on inhibiting the development of translation skills. The explanation is that it becomes routine when a person has many activities. At least these outside activities cause a person to have little free time to be used for self-study to develop grammatical knowledge of *nahwu* and *shorof* or hone Arabic translation skills.

Most students spend the afternoon on campus, and there are still some assignments from lectures to complete. Thus, the time to recite at night is a little time left to develop translation skills. Plus, fatigue affects the appearance of drowsiness, difficulty concentrating, and difficulty focusing when learning Arabic at the cottage. The tiredness and difficulty concentrating when studying shows that they cannot optimize the brain's attention performance during learning.

The lack of attention of a person in learning will affect one of the components that make up the cognitive map, namely structural representation. The effect/impact that arises from these influences forms structural pictures that are not strong due to lack of attention at the time of learning, which impacts the coherence of coding the characteristics of an object. The homogeneity of structural representation will affect the constraints of *tarkib* analysis in the translation of Arabic texts in the future, as one can forget or fail to retrieve the memory of structural representations of grammatical knowledge of Arabic memory.

One solution to increase learning attention to strengthen the structural representation of *nahwu* and *shorof* and develop Arabic translation skills is to choose Arabic learning activities in the cottage as activities that are prioritized over other activities, as has been explained in the results of the matchmaking analysis of the priority scale selection pattern between single-case research (Figure 5) and cross-case analysis (Figure 6) that the priority of studying in the cottage can improve Arabic translation skills. The selection of recitation in the lodge as a prioritized activity is a solution that must be instilled in someone who still needs to have a structural representation of *nahwu* and *shorof* who is still strong.

The selection of priority scales represents individuals choosing a specific goal. The desire to achieve these goals will encourage one to do things related to

achieving the goals that have been set, including strengthening structural representation and developing translation skills until a full Arabic translation cognitive map is formed. The link between the intrinsic impulse to achieve goals has been presented in Tolman's on purpose and cognition. In later experiments, Tolman stated that in the critical phase, the activity of individuals not only responds passively to a separate stimulus but rather they also actively select and compare stimuli. Other studies have also strengthened the drive to achieve goals, including the research of Langfield-Smith (1992) and Moran et al., (2021), which uses certain variables to stimulate subjects to establish needs to improve the formation of cognitive maps. Boccara et al. (2019) research explores the features of objects that are used as goals by experimental subjects.

Some of these studies corroborate the results of this study that selecting relevant priority scales will strengthen the cognitive map. Therefore, a person just learning *nahwu* and *shorof* at the college level needs to establish learning Arabic as an activity that is prioritized over other activities, such as lectures, organizations, work, or other activities.

### **Habituation as a Main Component in the Development of Arabic Translation Cognitive Maps**

Based on the results of pattern matching between single-case analysis (Figure 7) and cross-case analysis (Figure 8), it was found that habituation in Arabic translation improved cognitive map development. In contrast, the lack of habituation in Arabic translation hindered the growth of the cognitive map.

As we know, translation requires applying the grammatical knowledge of *nahwu* and *shorof*, so the habituation of Arabic translation will further strengthen the structural representation of *nahwu shorof*. The solid structural word of *Mahou* and short strongly supports efforts to quickly and precisely identify talking in future Arabic translations. Behrens et al. (2018) strengthened that structural representation is obtained from enrichment tasks. The assignment, in this case, can be interpreted as the continuity of the Arabic text analysis exercise to strengthen the structural representation of *nahwu shorof*.

Arabic translation also demands systematic organization of knowledge. A person used to translating Arabic will easily organize the diverse expertise he brings in translation to capture the meaning of the source text and restructure the translation sentence. With habituation, inferential planning in translation is also becoming improved in terms of reconstructive memory to capture the meaning and constructive imagination to constructive sentence restructuring. Epstein et al. (2017) and Park (2020), in their research, mentioned that a large number of individual experiences in dealing with a problem or task would form a structured scheme/abstraction in the brain that is useful in finding more efficient solutions in the future. This statement indicates the need for habituation to develop a cognitive map and a systematic thinking scheme in the brain.

Habituation is an essential component in the development of Arabic translation cognitive maps based on a study by Wollet and Maguire (2012), who found an improvement in the performance of cells in the hippocampus in taxi drivers in London who developed “knowledge” of London layout and could use this knowledge to navigate geographical spaces to choose the fastest route. Teki et al. (2012) also found a greater volume of gray matter in the hippocampus in professional piano players who performed piano pitch tuning based on their experience. Both studies took samples of someone proficient in their field, meaning that the subjects in the study have gone through habituation in their respective fields.

Thus, habituation is a significant and inseparable component in developing the Arabic translation cognitive map. Translation habituation can close or complement the previous shortcomings. The problems in the initial acquisition of *nahwu* and *shorof* representations could have been greater, and issues in the selection of priority scales from the activities.

## CONCLUSION

The difference in the way of thinking in translation is due to the difference in cognitive maps formed in each person. The differences in cognitive maps developed in each person are caused by differences in the strong or weak structural representation of *nahwu* and *shorof* as a result of differences in the acquisition of initial knowledge of *nahwu* and *shorof*, differences in the number of activities that affect the acquisition and development of Arabic translation skills, and differences in the selection of priority scale activities. The difference in inferential planning ability arises from the difference in the intensity of Arabic translation exercises/habituation. This difference in inferential planning can be seen in each person’s translation results.

This study examined the cognitive maps of Arabic translation at a lexicogrammatical level. At the same time, studying other supporting sciences of Arabic also plays an essential role in translation, especially in analyzing Arabic texts and capturing the meaning of Arabic texts. Thus, future researchers can study the Arabic translation cognitive map and can explore other linguistic aspects.

Cognitive map studies have also developed the mechanisms of the nervous system in the nervous brain that underlie the process of spatial navigation and abstract knowledge. Therefore, the researcher will be more interested if he examines the cognitive map of Arabic translation from mechanical aspects to the nervous system and the spatial navigation process in a person when translating Arabic texts.

## REFERENCES

- Behrens, T. E. J., Muller, T. H., Whittington, J. C. R., Mark, S., Baram, A. B., Stachenfeld, K. L., & Kurth-Nelson, Z. (2018). What is a cognitive map? Organizing knowledge for flexible behavior. *Neuron*, 100(2), 490–509. <https://doi.org/10.1016/j.neuron.2018.10.002>
- Boccaro, C. N., Nardin, M., Stella, F., O'Neill, J., & Csicsvari, J. (2019). The entorhinal cognitive map is attracted to goals. *Science*, 363(6434), 1443–1447. <https://doi.org/10.1126/science.aav4837>
- Bokeria, L., Henson, R., & Mok, R. M. (2021). Map-like representations of an abstract conceptual space in the human brain. *Frontiers in Human Neuroscience*, 15, 1–6. <https://doi.org/10.3389/fnhum.2021.620056>
- Bostelmann, M., Lavenex, P., & Banta Lavenex, P. (2020). Children five-to-nine years old can use path integration to build a cognitive map without vision. *Cognitive Psychology*, 121, 1–21. <https://doi.org/10.1016/j.cogpsych.2020.101307>
- Buckner, R. L., & Carroll, D. C. (2007). Self-projection and the brain. *Trends in Cognitive Sciences*, 11(2), 49–57. <https://doi.org/10.1016/j.tics.2006.11.004>
- Cresswell, J. W. (2016). *Research Design: Pendekatan Metode Kualitatif, Kuantitatif, dan Campuran* (A. Fawaid & R. K. Pancasari, Trans.; 1st ed.). Pustaka Pelajar.
- Daems, J., Vandepitte, S., Hartsuiker, R. J., & Macken, L. (2017). Identifying the machine translation error types with the greatest impact on post-editing effort. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.01282>
- Deckert, M. (2017). Translation and cognition: Cases of asymmetry. An Editorial. *Research in Language*, 15(2), 119–128. <https://doi.org/10.1515/rela-2017-0008>
- Eden, C. (2004). Analyzing cognitive maps to help structure issues or problems. *European Journal of Operational Research*, 159(3), 673–686. [https://doi.org/10.1016/S0377-2217\(03\)00431-4](https://doi.org/10.1016/S0377-2217(03)00431-4)
- Epstein, R. A., Patai, E. Z., Julian, J. B., & Spiers, H. J. (2017). The cognitive map in humans: Spatial navigation and beyond. *Nature Neuroscience*, 20(11), 1504–1513. <https://doi.org/10.1038/nn.4656>

- Extremera, J. J. A. (2015). Fitting culture into translation process research. *Translation & Interpreting*, 7(1), 26-46. Retrieved from <http://www.trans-int.org/index.php/transint/article/view/368>
- Flemming, D., Przysucha, M., & Hübner, U. (2015). Cognitive maps to visualise clinical cases in Handovers. *Methods of Information in Medicine*, 54(05), 412-423. <https://doi.org/10.3414/ME15-02-0001>
- Grewe, B. F., Gründemann, J., Kitch, L. J., Lecoq, J. A., Parker, J. G., Marshall, J. D., Larkin, M. C., Jercog, P. E., Grenier, F., Li, J. Z., Lüthi, A., & Schnitzer, M. J. (2017). Neural ensemble dynamics underlying a long-term associative memory. *Nature*, 543(7647), Article 7647. <https://doi.org/10.1038/nature21682>
- Guelton, B. (2019). Impact of navigation tools on pedestrian navigation: Preliminary results. *EAI Endorsed Transactions on Creative Technologies*, 6(18), 1-8. <https://doi.org/10.4108/eai.13-7-2018.160387>
- Hassabis, D., Kumaran, D., Vann, S. D., & Maguire, E. A. (2007). Patients with hippocampal amnesia cannot imagine new experiences. *Proceedings of the National Academy of Sciences*, 104(5), 1726-1731. <https://doi.org/10.1073/pnas.0610561104>
- Holubenko, N., & Demetskaya, V. (2020). Category of modality through the prism of multipole approaches in the modern translation theory. *Journal of History Culture and Art Research*, 9(2), 303-317. <https://doi.org/10.7596/taksad.v9i2.2500>
- Hsieh, L.-T., Gruber, M. J., Jenkins, L. J., & Ranganath, C. (2014). Hippocampal activity patterns carry information about objects in temporal context. *Neuron*, 81(5), 1165-1178. <https://doi.org/10.1016/j.neuron.2014.01.015>
- Hurtado Albir, A., Alves, F., Englund Dimitrova, B., & Lacruz, I. (2015). A retrospective and prospective view of translation research from an empirical, experimental, and cognitive perspective: The TREC network. *Translation & Interpreting*, 7(1), 5-25. <https://doi.org/ti.106201.2015.a02>
- Ishikawa, T., Fujiwara, H., Imai, O., & Okabe, A. (2008). Wayfinding with a GPS-based mobile navigation system: A comparison with maps and direct experience. *Journal of Environmental Psychology*, 28(1), 74-82. <https://doi.org/10.1016/j.jenvp.2007.09.002>

- Krüger, R. (2016). Situated LSP translation from a cognitive translational perspective. *Lebende Sprachen*, 61(2), 297–332. <https://doi.org/10.1515/les-2016-0014>
- Langfield-Smith, K. (1992). Exploring the need for a shared cognitive map. *Journal of Management Studies*, 29(3), 349–368. <https://doi.org/10.1111/j.1467-6486.1992.tb00669.x>
- Lee, H., & Kwon, S. J. (2014). Ontological semantic inference based on cognitive map. *Expert Systems with Applications*, 41(6), 2981–2988. <https://doi.org/10.1016/j.eswa.2013.10.029>
- McNaughton, B. L., Battaglia, F. P., Jensen, O., Moser, E. I., & Moser, M.-B. (2006). Path integration and the neural basis of the ‘cognitive map.’ *Nature Reviews Neuroscience*, 7(8), 663–678. <https://doi.org/10.1038/nrn1932>
- Moran, R., Dayan, P., & Dolan, R. J. (2021). Human subjects exploit a cognitive map for credit assignment. *Proceedings of the National Academy of Sciences*, 118(4). <https://doi.org/10.1073/pnas.2016884118>
- Munip, A. (2017). Buku jihad terjemahan dari bahasa arab dan potensi radikalisme beragama di lembaga pendidikan. *Cendekia: Jurnal Kependidikan Dan Kemasyarakatan*, 15(2), 175-196. <https://doi.org/10.21154/cendekia.v15i2.1080>
- Munip, A. (2019). Tantangan dan prospek studi bahasa arab di Indonesia. *Al Mahāra: Jurnal Pendidikan Bahasa Arab*, 5(2), 301-316. <https://doi.org/10.14421/almahara.2019.052.08>
- Newcombe, N. S. (2019). Navigation and the developing brain. *Journal of Experimental Biology*, 222(Suppl\_1), jeb186460. <https://doi.org/10.1242/jeb.186460>
- Nur, S. (2018). Problematika linguistik (ilmu al-lughah) dalam penerjemahan bahasa Arab ke bahasa Indonesia. *Al Qalam: Jurnal Ilmiah Keagamaan Dan Kemasyarakatan*, 9(17), 23-54. <https://doi.org/10.35931/aq.v0i0.52>
- O’Brien, S. (2013). The borrowers: Researching the cognitive aspects of translation. *Target. International Journal of Translation Studies*, 25(1), 5–17. <https://doi.org/10.1075/target.25.1.02obr>



- Park, S. A., Miller, D. S., Nili, H., Ranganath, C., & Boorman, E. D. (2020). Map making: Constructing, combining, and inferring on abstract cognitive maps. *Neuron*, 107(6), 1226–1238. <https://doi.org/10.1016/j.neuron.2020.06.030>
- Ren, L. (2015). Teaching model of japanese translation under perspective of cognitive linguistics translation theory. *Studies in Literature and Language*, 11(4), 69-72. <https://doi.org/10.3968/7787>
- Ren, L., & Wu, L. (2015). Cultural teaching for translation based on cognitive linguistics at college. *Studies in Literature and Language*, 11(6), 10-13. <https://doi.org/10.3968/8052>
- RISSC, T. R. I. S. S. C. (2021). The Muslim 500: The world's 500 most influential muslims, 2022. *Jordan National Library*, 301.
- Rojo, A. (2015). Translation meets cognitive science: The imprint of translation on cognitive processing. *Multilingua*, 34(6), 721–746. <https://doi.org/10.1515/multi-2014-0066>
- Rozak, A. (2018). Modernisme pembelajaran bahasa arab berbasis pesantren di Rangkasbitung Banten. *Arabi: Journal of Arabic Studies*, 3(2), 168-180. <https://doi.org/10.24865/ajas.v3i2.110>
- Schiller, D., Eichenbaum, H., Buffalo, E. A., Davachi, L., Foster, D. J., Leutgeb, S., & Ranganath, C. (2015). Memory and space: towards an understanding of the cognitive map. *Journal of Neuroscience*, 35(41), 13904–13911. <https://doi.org/10.1523/JNEUROSCI.2618-15.2015>
- Teki, S., Kumar, S., Kriegstein, K. von, Stewart, L., Lyness, C. R., Moore, B. C. J., Capleton, B., & Griffiths, T. D. (2012). Navigating the auditory scene: An expert role for the hippocampus. *Journal of Neuroscience*, 32(35), 12251–12257. <https://doi.org/10.1523/JNEUROSCI.0082-12.2012>
- Tolman, E. C. (1948). Cognitive maps in rats and men. *Psychological Review*, 55(4), 189–208. <https://doi.org/10.1037/h0061626>
- Vyacheslavovna, L. V. (2018). Cognitive aspects of translation. *Language, Individual & Society*, 12(1), 99–107. Retrieved from <https://www.scientific-publications.net/en/article/1001770/>
- Woollett, K., & Maguire, E. A. (2012). Exploring anterograde associative memory in London taxi drivers. *NeuroReport*, 23(15), 885–888. <https://doi.org/10.1097/WNR.0b013e328359317e>

- Yi, C. (2020). An overview of cognitive translation studies. *Canadian Social Science*, 16(5), 39-43. <https://doi.org/10.3968/11732>
- Yin, R. K. (2013). *Studi Kasus: Desain & Metode* (D. Mudzakir, Trans.; 1st ed.). Rajawali Press.
- Zeithamova, D., Dominick, A. L., & Preston, A. R. (2012). Hippocampal and ventral medial prefrontal activation during retrieval-mediated learning supports novel inference. *Neuron*, 75(1), 168-179. <https://doi.org/10.1016/j.neuron.2012.05.010>
- Zuhdi, M. H. (2017). Radikalisme agama dan upaya deradikalisasi pemahaman keagamaan. *Akademika : Jurnal Pemikiran Islam*, 22(1), 199-224. Retrieved from <https://e-journal.metrouniv.ac.id/index.php/akademika/article/view/568>