# Animate or Inanimate: How Does Animacy Affect Relative Clauses Production for Indonesian and Foreign Learners

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**ABSTRACT**

In second language learning, relative clauses are widely studied. However, research comparing Indonesian and foreign learners' clauses based on animacy has not been widely done. Besides, animacy affects the difficulty of producing relative clauses. Therefore, this study investigates the role of animacy in the production of relative clauses, the relationship between movement distance and the production of relative clauses, and the role of animacy in conformity with the rules of relative clauses. This research employs a descriptive case study. Data was collected from documents on popular article texts of Indonesian and foreign learners of the University of Muhammadiyah Malang. The data were analyzed based on the generative transformation theory developed by Noam Chomsky. The study results show that animacy plays a significant role in producing relative clauses. Indonesian and foreign learners compose more relative clauses on inanimate nouns, which function as subjects, objects, and complements. Foreign learners create more relative objects than subjects. Based on distance, short-movement relative clauses are very productive for Indonesian and foreign learners. Most Indonesian (97%) and foreign (85%) learners have produced relative clauses that conform to the rules. However, relative clauses with inanimate head nouns often break the rules.

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## 1. INTRODUCTION

Relative clauses form more complex sentences. A relative clause comprises a head noun, a relativizer, and a modifying clause. In Indonesian, relative clauses are attached to nouns utilizing the relativizer "yang" (Fortin, 2018; Irmawati, Shindo, & Matsumoto, 2017; Tsukida, 2018), which also acts as a ligature (Arka, 2013).

Based on Noam Chomsky's *Generative Transformation Theory*, moving a noun to the argument-bar position causes it to be unable to assume the argument role (Müller, 2012). This phenomenon refers to the argument bar movement, which produces relative clauses

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(Chomsky, 1988, 2000; Coon, Pedro, & Preminger, 2014; Haegeman, 1994). The consequence of the movement is creating a derived constituent structure and traces of movement that appear in the surface structure. Meanwhile, the deep structure shows the primary form of sentences before they undergo movement (Haegeman, 1994). Movement can only pass through one bounding node if the bounding node is an inflected phrase or a noun phrase. A bounding node is a moving boundary node in the form of a sentence-building phrase, so the word or phrase it dominates cannot be moved past that boundary node (Cook & Newson, 2014; Haegeman, 1994).

Based on initial interviews with learners of the Indonesian Language for Foreign Speakers of the University of Muhammadiyah Malang, relative clauses are studied discretely because grammar learning is integrated into communication practices. However, foreign learners experience problems in producing Indonesian relative clauses. On the contrary, Indonesian learners of the University of Muhammadiyah Malang can create relative clauses but do not understand the rules, so they still experience errors in the relative clauses. Thus, it can be stated that learners of Indonesian and other languages have difficulty forming relative clauses.

As a consequence of these issues, obstacles in producing relative clauses arose. It was proven by previous research that the difficulty level of processing relative clauses and the distribution of relative subjects were influenced by the animate nature of nouns or animacy (Mak, Vonk, & Schriefers, 2002). Animacy is a semantic feature of words (Tsimpli & Dimitrakopoulou, 2007) that influences the production of syntactic structures of clauses and sentences. Noun consists of two types based on animacy: animate and inanimate. Animacy influences word order in languages dependent on how the agent phase is expressed (Perera & Srivastava, 2016). The prior findings suggest language-specific limits on relative phrase formation and animacy-based retrieval order variation across languages (Perera & Srivastava, 2016) during linguistic encoding (Rodrigo, Igoa, & Sakai, 2018).

The obstacles of relative clause production are due to the influence of the noun's animate nature on the choice of clause structure (Fanselow, Schlesewsky, Vogel, & Weskott, 2011) and the semantic features of words (Tsimpli & Dimitrakopoulou, 2007). Previous studies also have claimed that animacy significantly influences grammatical characteristics in the world (Krause & Von Heusinger, 2019) because animacy affects the production and comprehension of relative clause structures (Gennari & MacDonald, 2008, 2009). Based on animacy, the characteristics of nouns are divided into two types: animate and inanimate.

Research that discusses animacy in language production has been carried out, namely the role of animacy in obtaining Arabic gender agreement (Alamry & Sabourin, 2017), the effect of animacy on the processing of Dutch and German relative clauses (Mak et al., 2002), the relationship of animacy to the understanding of English relative clauses (Wagers & Pendleton, 2015), as well as the role of animacy towards the relative objects of Turkish learners (Uzunca, 2021). Furthermore, (Fanselow et al., 2011) investigated the impact of animacy on the wh-movement in German, and (Kwon, Ong, Chen, & Zhang, 2019) examined the influence of animacy and structural information on the attachment of Chinese relative clauses in language production.

However, most research on relative clauses has concentrated on languages with postnominal modifications, such as English and other European languages. However, few studies have explored the acquisition of relative clauses in Asian languages (Ozeki & Shirai, 2007). Research generally analyzes Indonesian learners' acquisition of foreign language

relative clauses. Meanwhile, previous research has discussed Indonesian learners' acquisition of relative clauses (Ekaristianto, Purnanto, & Sumarlam, 2019) and Indonesian language learners for foreign speakers (Sari, Andayani, & Sumarlam, 2017; Suharsono, 2016), but it is not yet associated with animacy. Previous research has not addressed the function of animacy in Indonesian relative clauses. Thus, there is currently a lack of studies comparing Indonesian and non-Indonesian learners to explore the function of animacy in the generation of relative clauses. The relationship between animacy and relative clauses must be revealed to compare animacy's role in two different speaker characteristics.

Based on this gap, the use of generative transformations to investigate argument bar movement (wh-movement) in relative clauses was also recommended by prior research (Prihatini, 2019a, 2019b) so the relationship between noun animacy and its extraction can be explained (Atkinson, Apple, & Omaki, 2016). Moreover, research about animacy's role in producing higher complicated structures was underdeveloped, like relative clauses (Gennari & MacDonald, 2009). Thus, this study aims to investigate three aspects: (1) the role of animacy in the relative clauses formation by Indonesian and foreign learners, (2) the link between noun movement distance and the relative clauses production by Indonesian and foreign learners, and (3) the effect of animacy on the suitability of the relative clause rules. The results of this study can contribute as a consideration in designing materials, media, or assessments of Indonesian learning as a second language for Indonesian and foreign learners.

## 2. METHOD

This research was conducted using a qualitative approach and a descriptive case study. The data are relative clauses produced by Indonesian and foreign learners sourced from the writings of Indonesian and foreign learners. The research participants were chosen according to specified criteria using purposive sampling: (1) Indonesian learners at the University of Muhammadiyah Malang (UMM) who acquired Indonesian as their first or second language, (2) foreign learners from the Darmasiswa and KNB Scholarship (Kemitraan Negara Berkembang/ Developing Countries Partnership) at UMM, (3) learners who do not have language disorders, and (4) adult learners. Based on these criteria, the research subjects obtained were 35 Indonesian and 31 foreign learners.

Data analysis was carried out qualitatively in five steps. First, identify the deep and surface structures in sentences containing relative clauses (Haegeman, 1994). Second, the deep and surface structures are analyzed for the purpose, trace, and consequences of argument bar movement in relative clauses (Friedmann & Lavi, 2006) by utilizing the move alpha theory (Haegeman, 1994). Third, the animacy of nouns in relative clauses is analyzed using the theta theory sub-theory to identify the propositional relationship between arguments and their predication based on animacy as their semantic feature (Haegeman, 1994). Fourth, the compliance of argument bar movement with the Indonesian language rule is analyzed based on the animacy role of head nouns in relative clauses. Fifth, the findings of animacy in relative clauses are classified based on several criteria to calculate their frequency and percentage in a simple descriptive quantitative using Microsoft Excel. The criteria used include several characteristics, namely (1) head noun animate or inanimate, (2) relative clauses on subjects, objects, or complements, and (3) conformity with Indonesian rules.

Data analysis also identifies and interprets relative clause structure errors based on their relevance to the head noun animacy. The research findings are theoretically analyzed and compared to the results of previous studies. This interpretation yields propositions that explain relative clauses production based on the effect of animacy for Indonesian and foreign learners.

## 3. RESULTS AND DISCUSSION

Based on the data found, the study results show similarities and differences in the characteristics of relative clauses based on the animacy of the relative clause in the texts of Indonesian and foreign learners.

### 3.1 The Role of Animacy in the Production of Relative Clauses for Indonesian and Foreign Learners

The result is presented as follows.

**Table 1**
The role of animacy in the production of relative clauses for Indonesian and foreign learners

| Relative Clause Types | Animacy on Noun Head of Relative Clause (%) | | | |
|---|---|---|---|---|
| | Indonesian Learner | | Foreign Learner | |
| | Animate | Inanimate | Animate | Inanimate |
| Relative subject | 17.33% | 36.67% | 10.71% | 19.64% |
| Relative object | 13.33% | 20.67% | 1.79% | 39.29% |
| Relative complement | 2.00% | 10.00% | 1.79% | 26.79% |
| Amount | 32.67% | 67.33% | 14.29% | 85.71% |
| Total | 100% | | 100% | |

Table 1 shows that inanimate nouns have higher productivity in relativization than animate nouns (67.33%). Based on the syntactic function, most relative clauses are attached to the inanimate noun head to form a relative subject, object, and complement. These findings confirm that inanimate nouns are more productive than animate nouns in forming relative clauses for Indonesian and foreign learners.

Meanwhile, the effect of animacy in composing relative clauses for foreign learners is slightly different from the relative clauses for Indonesian learners. Table 1 shows that foreign learners tend to relativize inanimate nouns. Syntactically, the relativizing number of inanimate nouns is used in relative subjects, objects, and complements. However, foreign learners produced more relative objects. Thus, inanimate nouns are more productive in relative clauses for Indonesian and foreign learners.

This study found that Indonesian and foreign learners more frequently relativize inanimate nouns. Moving inanimate nouns to the argument bar position is easier to form relative clauses. This part of the findings is consistent with what (Atkinson et al., 2016) discovered in wh-phrase in English wh-island. Their study demonstrated that the productivity of inanimate nouns in relativization is due to their characteristics which are easier to extract from the island, so it undergoes argument bar movement and produces relative clauses. On the contrary, processing animate nouns is more challenging than inanimate for learners and native speakers (Sagarra & Herschensohn, 2013). Previous

studies also prove that sentence structures containing inanimate nouns produce predictions that are always compatible (Wagers & Pendleton, 2015). In contrast, the results differ from (Kwon et al., 2019), who suggest that in Chinese, inanimate nouns are less likely to be modified by a relative clause than animate nouns.

Previous research claimed that the mechanism of the animacy-based retrieval sequence is consistent. The animate noun head in the relative clause is conceptually and topically prominent, so it serves as the subject of a verb of the relative clause (Gennari, Mirković, & MacDonald, 2012). Thus, animate entities have a tendency to be conceptually accessible because they have high inherent accessibility and high derived accessibility in a given communication situation (Perera & Srivastava, 2016). Inanimate agents receive less attention than animate ones, especially when the patient is inanimate (Rodrigo et al., 2018). Conversely, because the inanimate noun head is conceptually less prominent, it is rarely utilized as the subject of a verb of the relative clause, despite being the subject of the query (Gennari et al., 2012).

In contrast to the findings of Gennari et al., this study found that the inanimate noun head is used more commonly in relative clauses on subjects, objects, and complements by both Indonesian and foreign learners. In other words, inanimate head nouns have a stronger focus than animate head nouns in relative clauses produced by Indonesian and foreign learners.

Regarding syntactic function, this result reveals that relative clauses are more frequent, with inanimate nouns serving as subjects and objects. These results support (Gennari et al., 2012), who discovered that in English, inanimate nouns typically produce relative objects, whereas animate nouns tend to generate relative subjects. However, this study demonstrates that foreign learners favor relativizing inanimate nouns in objects, while Indonesian learners prefer relativizing inanimate nouns in subjects. (Uzunca, 2021) also discovered that Turkish native speakers and learners prefer active object relative clauses. In contrast to these findings, some research has revealed that foreign students in Indonesian learning are more productive in attaching relative clauses to subjects (Sari et al., 2017; Suharsono, 2016).

Contrary to the findings of this study, in Chinese, the relative subject tends to form from the animate noun, but animacy does not affect the formation of the relative object (Kwon et al., 2019). Similarities and differences in these research findings suggest that animacy affects the formation of relative clauses based on grammatical function. Similar to Chinese, this animacy impact influences the grammatical function of a head noun phrase in a relative clause (Kwon et al., 2019).

In this study, most foreign learners attach relative clauses to objects with inanimate head nouns. However, Indonesian students use relative clauses on subjects with inanimate nouns. Nevertheless, inanimate nouns dominate relative objects for Indonesian and foreign learners equally. These findings are congruent with the research (Wagers & Pendleton, 2015) that relative clauses with animate noun heads are rarely found in relative objects because animate arguments tend to occupy the subject position in the syntactic structure. In other words, relative objects tend to contain inanimate head nouns (Kwon et al., 2019). However, these findings differ from the research by (Mak et al., 2002) and (Adriana Belletti & Chesi, 2010). Relative objects with the inanimate noun head and the subject animate are most commonly found in Dutch and German (Mak et al., 2002) and Italian (Adriana Belletti & Chesi, 2010). Therefore, a head noun phrase's grammatical function and animacy are tightly related in forming relative clauses (Kwon et al., 2019).

Based on the syntactic function, foreign learners prefer producing relative clauses on objects and complements at the end of sentences. Indonesian learners also tend to produce relative clauses on objects and complements, although less than foreign learners. These findings can be explained based on recency preference, in which a person tends to embed additional information—in this case, a relative clause—in the last noun phrase spoken/written due to human short-term memory (Gibson, Pearlmutter, Canseco-Gonzalez, & Hickok, 1996). The findings of this study show compatibility with the recency hypothesis, particularly for foreign learners, as most nouns that undergo relativization are objects and complements, which are conveyed last. Foreign learners use more of their short-term memory in producing relative clauses than Indonesian learners because they learn Indonesian in a shorter period.

In this study, it can be assumed that object relative is easier to produce because it is the last constituent of the main sentence structure. Therefore, Indonesian and foreign learners tend to attach relative clauses to object nouns because they are more practical than relativizing the subject at a higher constituent node. This research follows the late closure principle in relativizing animate and inanimate head nouns. According to this principle, everyone delays closing the last constituent by locally attaching new material. It is more practical in the computational process than attaching new material non-locally at a higher node (Maia, Fernández, Costa, & Lourenço Gomes, 2007). Based on the late closure principle, in the reception and production of language, someone interprets the last constituent in sentence processing in each language, for example, to avoid ambiguity (Fernández, 2003).

Notably, this study found that animacy contributes to forming relative clause structures among Indonesian and foreign learners. This finding is evident from constructing relative clauses, typically composed of inanimate nouns. It is noteworthy that this study and previous research similarly found that animacy also plays an essential part in Chinese relative clause attachment (Hsiao & MacDonald, 2016; Kwon et al., 2019), Turkey (Uzunca, 2021), English, Spanish, and Serbian (Gennari et al., 2012). However, these results differ from previous research conducted in various languages. Animacy effects are not salient in Spanish and are only barely noticeable in Japanese (Rodrigo, Igoa, & Sakai, 2018). The object's animacy property in Germany does not affect the argument-bar movement construction (Fanselow et al., 2011). In Spanish, it was also found that there was no significant relationship between the animacy factor of the object and the relativized argument (Vicente, 2013).

Thus, it can be concluded that the role of animacy in various languages differs as previous research stated that every language in the world has semantic and syntactical characteristics in argument bar movement in the formation of relative clauses (Vicente, 2013). The animacy effect varied among languages because animacy nature was not universal (Gennari et al., 2012). The high animacy effects on relative clause generation have typically been conducted in European languages with head-first relative clauses, where the animate/inanimate head noun precedes the relative clause. Moreover, languages with head-final relative clauses also show animacy's influence, as in Chinese (Hsiao & MacDonald, 2016). In this study, the Indonesian language is also head-first relative clauses and considers the role of animacy. Thus, it can be concluded that animacy affects languages with head-first and head-final relative clauses. However, the characteristics of its influence vary from each language.

However, the semantic pattern in animacy is proven to have similarities and also differences, as discussed above, as previous research found that differences in relative clause attachments reflect grammatical differences between languages (Grillo & Costa, 2014; Perera & Srivastava, 2016). (Perera & Srivastava, 2016) argue conceptual accessibility restrictions like animacy may affect languages differently. In a semantic processing stream, sentential subject animacy may determine thematic role assignment. In contrast, The syntactic stream may interpret morphosyntactic rules without animacy (DeDe, 2015). Thus, the clause structure must be adjusted to pay attention to the proposition relationship based on the argument's nature, the sentence structure's completeness, and the transformation structure (Prihatini, 2021).

### 3.2 Relation Between Movement Distance and Relative Clause Production

The result is presented as follows.

**Table 2**
Movement distance in relative clauses of Indonesian and foreign learners

| **Relative Clause Types** | **Movement Distance in Relative Clauses (%)** | | | |
|---|---|---|---|---|
| | **Indonesian Learner** | | **Foreign Learner** | |
| | **Short** | **Long** | **Short** | **Long** |
| Relative subject | 46.67% | 7.33% | 44.64% | 1.79% |
| Relative object | 30.67% | 3.33% | 28.57% | 3.57% |
| Relative complement | 11.33% | 0.67% | 17.86% | 3.57% |
| Amount | 88.67% | 11.33% | 91.07% | 8.93% |
| Total | 100% | | 100% | |

Table 2 shows high productivity in short-movement relative clauses for Indonesian and foreign learners. This finding demonstrates that Indonesian and foreign students prefer moving the noun head by passing only a single bounding node to the argument bar. These findings are due to animacy affecting movement distance and learners' preference in moving an inanimate noun head to the argument bar position.

The following are some of the data found.

(1) *[**Setiap sekolah** [yang [IP t menawarkan pembelajaran tatap muka tetap harus melengkapi daftar periksa dan melaksanakan perjanjian kesehatan]]].*
[Every school that [IP t offers learning face-to-face meetings still has to complete a checklist and carry out health agreements]]].

Data (1) contains a relative subject because the inanimate noun phrase *setiap sekolah* (every school) moves from the IP node by passing a bounding node so that it occupies a position that can no longer accept the argument role of the predication *menawarkan* (offer). Because it passes through one bounding node, data (1) is included as a short movement.

(2) *[Ada **beberapa anggota***
*[yang [IP t sudah bekerja di atas*
*10 tahun [yang [IP t ikut*
*dalam tes tersebut]]]]].*
[There are some members who [IP t already worked over ten years [which [IP t took the test]]]]].

Data (2) is also a relative subject in the inversion sentence structure because the predicate ada (there) precedes the subject *beberapa anggota* (some members), which is classified as an animate noun. In addition, data (2) is classified as a long movement because the noun phrase *beberapa anggota* (some members) has moved twice from the lowest IP node to the higher IP node, leaving two traces of movement marked with the letter t (trace).

(3) *[Petugas pembaharuan data baik di lapangan atau di pusat diharapkan memiliki **sikap** [yang [IP t responsif*
*dan tegas dalam memilah data]]]].*
[Data update officers either in the field or at the center are expected to have a responsive [IP t attitude and firm in sorting data]]]].
(4) *[Virus corona ini adalah **salah satu penyakit** [yang [IP t*
*menyerang saluran pernapasan terutama paru-paru]]].*
[This coronavirus is one of the diseases [which [IP t attacks the respiratory tract, especially the lungs]]].

Data (3) contains a relative object because the inanimate noun *sikap* undergoes short movement. Data (4) is also a short movement, but relativization occurs in inanimate nouns that function as complements. So, data (4) is a relative complement. This relative complement term has not been widely used. It is essential to differentiate between relative objects and relative complements in Indonesian considering syntactic and semantic patterns. In Indonesian, *adalah* is a copula. Constituents after copula are not objects but complements, so they cannot be passive.

Short movement relative clauses are very productive for Indonesian and foreign learners because they have a simpler noun movement process than long movement. Previous research also demonstrates that foreign learners of Indonesian have mastered argument bar movement in producing relative clauses while still using simple sentence structures (Prihatini & Pangesti, 2021). The generative transformation theory states that short movement occurs because nouns move from one position to another by passing one bounding node, which prevents the noun from receiving the argument role. In contrast, long movement passes more than one bounding node (Haegeman, 1994).

The preferences of Indonesian and foreign students towards short movements indicate that Indonesian is a language with low and high attachment in forming relative clauses. According to previous studies, long relative clauses are more frequently attached to high attachments. In contrast, short relative clauses are attached to low attachments (Fromont, Soto-Faraco, & Biau, 2017), particularly in German, English, Spanish, and French (Hemforth et al., 2015). Grillo & Costa (Grillo & Costa, 2014) conveys that the original relative clause always performs low attachment.

However, high attachment is owing to the availability of the Pseudo Relative structure in Spanish, Italian, and French but not English or German. The pseudo relative structure is a small clause complement with perceptual verbs that may only employ the first noun as the subject (Grillo & Costa, 2014). This study found that Indonesian also allows pseudo relative clauses, for example, *saya melihat John yang sedang berlari* (I saw John who is running). In contrast, research (Chen, 2005) found that Chinese language learners tend to avoid sentences containing small clauses because learners experience difficulties acquiring small clause structures.

Based on the length of words, Indonesian and foreign learners prefer to construct short relative clauses if the noun head is likewise short. This research corroborates previous studies that foreign learners frequently produce short movements and employ relative clauses with only one predicate in a short structure (Prihatini & Pangesti, 2021). Previous research also states that in Indonesian, relative clauses can modify four types of constituents, namely words (for example, *api*/fire), compound words (for example, *kereta api*/train), word groups (for example, *kakak dan adik*/brother and sister), and phrases (for example, *perempuan cantik*/beautiful female) (Ekaristianto et al., 2019). Based on these four constituents, this study found that Indonesian and foreign learners use short relative clauses to modify short nouns and noun phrases and vice versa. This preference indicates that low attachment may dominate relative clauses production, as found (Fromont et al., 2017).

Balanced Sister predicted relative clause length. Fodor's Balanced Sister hypothesis states that constituents, such as relative clauses, adhere to sister constituents with identical lengths to establish prosodic balance. For example, short relative clauses are commonly appended to single-word nouns. On the other hand, long relative clauses are attached to noun phrases that consist of more words (Hemforth et al., 2015).

Regarding syntactic complexity, animacy impacts both the early and late stages of complex-sentence processing (Lowder & Gordon, 2014). More complex sentence structures refer to relative clauses that undergo long movements, but the productivity is insignificant, namely 11.33% for Indonesian learners and 8% for foreign learners. The tendency of Indonesian and foreign learners to form relative clauses with short movements implies that the structure is not very complex.

### 3.3 The Role of Animacy on Compliance of Rules in the Production of Relative Clauses

The research findings are presented in the following figure based on compliance with the relative clause rules.

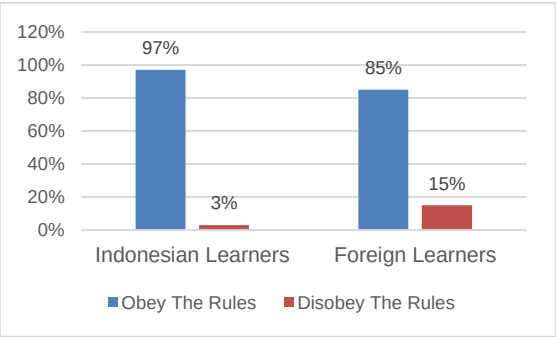


**Fig. 1.** Findings of Rule Compliance in Relative Clause Production

Figure 1 indicates that most Indonesian learners (97%) and foreign learners (85%) have produced relative clauses by obeying the rules. Errors in using grammatical rules generally occur in relative clauses with inanimate head nouns. These findings indicate that the productivity of inanimate nouns in relative clauses raises the risk of language error. However, future studies can shed light on these concerns.

The following are relative clause data not in compliance with the rules.

(5) *[**Kegiatan belajar – mengajar** *[yang [IP t akan dilakukan*

*secara online melalui platform seperti zoom, google meet, google classroom, dan whatsapp group]].*
[Teaching and learning activities [that [IP t will be carried out online through platforms such as zoom, google meet, google classroom, and WhatsApp group]]].

The data (5) contains an unnecessary relative clause because it removes the predicate from the sentence, leaving only the subject *kegiatan belajar-mengajar yang akan dilakukan* and adverb *secara online melalui platform seperti zoom, google meet, google classroom, dan whatsapp saja*. Consequently, the verb phrase *akan dilakukan* that followed the relativizer *yang* (that) transformed into a relative clause. The relativizer must be eliminated to be grammatically correct. Thus, there are no problems with the sentence's grammatical function. So, the grammatical function consists of subject *kegiatan belajar-mengajar*, predicate *akan dilakukan*, adverb *secara online melalui platform seperti zoom, google meet, google classroom, dan whatsapp group*.

(6a) *[IP Vaksin AstraZeneca merupakan **salah satu vaksin COVID-19** [IP t berasal dari Inggris bersama ilmuan di University of Oxford]]].
[The AstraZeneca vaccine is one of the COVID-19 vaccines [IP t originated in England with scientists at the University of Oxford]]].

The data (6a) lacks a relative clause, yet has two predicates, resulting in a grammatical error. The predicate are *merupakan* (is) at the first IP node and *berasal* (originates) at the second IP node. Therefore, the sentence's grammatical function involves subject *vaksin AstraZeneca*, predicate *merupakan*, complement *salah satu vaksin Covid-19*, predicate *berasal*, and the adverb *dari Inggris bersama ilmuan di University of Oxford*. The grammatical function at the second FI node shows a movement trace (t). However, the movement is not possible because the second IP node's bounds are ambiguous.

Sentence (6a) can be fixed by adding a relativizer before the second FI node, as in sentence (6b).

(6b) [IP Vaksin AstraZeneca merupakan
**salah satu vaksin Covid-19** [yang [IP t berasal dari

Inggris bersama ilmuan di University of Oxford]]].
[IP The AstraZeneca vaccine is one of the COVID-19 vaccines [which [IP t originated in England with scientists at the University of Oxford]]].

In (6b), NP *salah satu vaksin Covid-19* moves to the argument bar, so it is no longer an argument of predication *berasal*. Therefore, a relative clause modifies the NP in (6b). The grammatical function of the sentence is subject *vaksin AstraZeneca*, predicate *merupakan*, complement *salah satu vaksin Covid-19*, and adverb *dari Inggris bersama ilmuan di Oxford*. So, the sentence has no grammatical function errors.

In addition, sentence (6a) can be fixed by forming a relative clause at the first IP node.

(6c) [FI **Vaksin** **AstraZeneca** [yang [FI t merupakan salah satu vaksin COVID-19 berasal dari Inggris bersama ilmuan di University of Oxford]]].
The AstraZeneca vaccine, which is one of the COVID-19 vaccines, originated in England with scientists at the University of Oxford

The relativized in (6c) is carried out to NP *vaksin Astrazeneca* at the first IP node. NP only passes through one IP bounding node, so this movement is short. NP *vaksin Astrazeneca* was originally an outward argument of predication *merupakan*. However, the movement prevented NP from occupying the argument because its destination was the argument bar. This movement created a relative clause by adding a relativizer between *vaksin AstraZeneca* and the following IP node.

The productivity of relative clauses with the inanimate head noun is the highest in this study, indicating that the relativization process is more predictable. Previous research also discovered that processing problems in relative clauses are controlled by animacy because different animacy features activate distinct processes. When nouns are animate, the understanding of syntactic representations is predictively expanded, resulting in subject gaps. However, no subject gap is predictively encoded when nouns are inanimate, so relative clauses are easily processed. Combining the two arguments is the source of the animacy effect exerted on the relative clause's subject (Wagers & Pendleton, 2015). (Fanselow et al., 2011) also found that most participants could justify the grammatical acceptance of relative clauses in German with inanimate nouns rather than animate nouns. On the contrary, the case in Arabic (Alamry & Sabourin, 2017) proves that noun animacy has a significant effect because second-language learners have better language performance in sentences containing animate nouns than inanimate nouns.

However, non-compliance with the rules is also dominated by the relativization of inanimate nouns. Therefore, it may be proposed that the relativization productivity of inanimate nouns raises the risk of non-compliant relative clause structure. However, relative clauses with non-compliance with the rules are relatively low for Indonesian learners (3%) but significantly higher for foreign learners (15%). The finding indicated that island sensitivity was present in both natives and learners. Our findings support the grammatical interpretation of island effects and show that syntax constraints wh-dependencies in L1 and L2 grammars (Aldosari, Covey, & Gabriele, 2022).

Non-compliance with the rules leads to language errors in long relative clauses. Long relative sentences contain a more complex structure than short relative clauses, enabling the movement of nouns more vulnerable to language errors. Previous research also proves that the role of animacy in nouns will only affect proficient learners' language production if the sentence structure is more complex (Tsimpli & Dimitrakopoulou, 2007). This study found that animacy affects the construction of long relative clauses because it determines noun

roles. Another study found that differences in noun animacy affect the later processing of complex sentences due to memory retrieval during thematic role assignment (Lowder & Gordon, 2014).

Nevertheless, Indonesian learners make fewer mistakes in animacy-based relative clauses. It is because Indonesians learn and use the language longer than foreigners. (Sagarra & Herschensohn, 2013) also show that the animacy nature of nouns influences the language processing of speakers of the first and second languages in Spanish. On the contrary, in Arabic, (Alamry & Sabourin, 2017) prove that animacy does not affect language performance in first-language speakers. In addition, second-language learners tend to produce sentences with animate nouns that conform to grammatical rules in Arabic.

Notably, foreign learners are more likely to disobey the rules since they study Indonesian as adults, whereas Indonesian learners have acquired and learned the language since childhood. Indonesian learners utilize Indonesian as their first or second language. Conversely, Indonesian is a foreign language for international students whose grammatical structure is unfamiliar. This research pertains to the shallow structure theory, which posits that adult foreign language learners experience less syntactic processing than native language learners. Based on this hypothesis, adult speakers and children also experience less syntactic processing (Clahsen & Felser, 2006).

In this study, it may be proposed that Indonesian learners have an adequate understanding of the relative clause structure than foreign learners because there is a minimal language error in the relative clause of Indonesian learners. Understanding animacy and comprehending the principles of argument bar movement are requirements for producing these Indonesian relative clauses. It was demonstrated that the nouns inanimate and long movement include the most errors. Most of the relative clauses produced by BIPA students were appropriate to the Indonesian language rule in the form of short movements (Prihatini, Fauzan, & Pangesti, 2022). Previous research also demonstrates that learners performed significantly worse than native speakers in Arabic (Alamry & Sabourin, 2017). In this regard, the findings of (Kwon et al., 2019) imply that the relative clause type interacts with the animacy effect in relative clause attachment. So, it can be concluded that animacy and noun-movement process affect relative clauses type produced by Indonesian and foreign learners.

## 4. CONCLUSION

Based on the findings, it can be concluded that inanimate nouns have high productivity in producing relative clauses for Indonesian learners (67.33%) and foreign learners (85.71%). Based on the syntactic function of relativized nouns, Indonesian learners prefer to produce relative subjects. In contrast, foreign learners are relative objects but are equally dominant in the relativization of inanimate nouns. Non-compliance with the rule is also more common in relative clauses with an inanimate noun, leading to language errors. However, just 3 % of Indonesian and 15 % of foreign learners perform poorly following these rules. Based on the movement distance, Indonesian and foreign learners prefer short movements in relativization.

These findings can contribute as a basis for developing materials, media, or assessments for learning Indonesian. Therefore, Indonesian language learning could prioritize teaching relative clause structures with the inanimate noun and then animate. In addition, learning needs to prioritize relative clauses, classified as short and long

movements. It is intended that language learners can build an understanding of the relative clause structure gradually based on the level of difficulty and the role of the animacy. Based on these findings, there are limitations to this study which are still focused on the production of relative clauses in adult learner text. Therefore, further research is suggested to examine the relationship between animacy and the suitability of relative clause rules in producing more diverse spoken and written texts by involving international and diversified participants.

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**Authors' Contribution**
Arti Prihatini worked on the project and the main conceptual ideas, wrote the manuscript, and worked on almost all of the data analysis. Fida Pangesti collected and analyzed the data. Petrus Ari Santoso and Ho Ngoc Hieu worked on data visualization, improved discussion, and proofread the manuscript.

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