

# Scope-marking strategies in the acquisition of long-distance wh-movement in L2 English by adult Mongolian speakers

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## Abstract

This study investigates whether more economical derivations predate less economical ones in the acquisition of long-distance (LD) wh-movement in second language (L2) English. Production data of LD wh-movement have been elicited from 97 adult Mongolian speakers in Ulaanbaatar. The participants were at the age between 19 and 23 (female = 94, male = 3, mean age = 20), who were classified into advanced and developing groups. While LD wh-movement was infrequently observed, wh-scope marking predominantly emerged, possibly because it dispenses with Internal Merge of the wh-phrase pied-piping Q across the clausal boundary. On the other hand, the developing group depended more on silent-scope marking, possibly because the wh-expletive might not have been available in their lexicon. Moreover, the advanced group initially displaced the least possible elements containing the wh-phrase when attempting to derive LD wh-movement, while the developing group could not even displace any elements but spelled-out the wh-phrase in situ. Overall, economy conditions in language acquisition turns out to govern the Mongolian-English interlanguage; hence, more economical derivations emerge at the onset as long as they are admissible, not necessarily grammatical.

## Keywords

L2 acquisition, long-distance (LD) wh-movement, wh-copying, wh-scope marking, silent-scope marking, wh-expletive, Q-morpheme, Mongolian, interlanguage

## I Introduction

Long-distance (LD) wh-movement engages the processing mechanism in moving the wh-phrase from the base position in embedded clause to the sentence-initial position in matrix clause, as in (1).

- (1) a. [<sub>CP</sub> Who<sub>3</sub> do you think [<sub>CP</sub> *t*<sub>2</sub> *t*<sub>1</sub> loves Julianne]]? [wh-subject movement]  
b. [<sub>CP</sub> Who<sub>3</sub> do you think [<sub>CP</sub> *t*<sub>2</sub> Julianne loves *t*<sub>1</sub>]]? [wh-object movement]

As the wh-phrase overtly situates in this position after moving a ‘long’ distance, the structure turns into a proper biclausal direct wh-question—a type of bound variable question (Bailey, 2013).

The contentful wh-phrase *Who*, as a variable defining a set of answers that are contextually restricted, merges initially into an argument position in embedded clause. Once the complementizer phrase (CP) is available in embedded clause, the wh-phrase clause-internally moves to the specifier position of CP (Spec-CP), as leaving behind its copy  $t_1$  in the base position (Chomsky, 1995). When a new clause containing a bridge verb (e.g. *think*, *ask*, *believe*, etc.) merges as a matrix clause and c-commands its embedded clause, the wh-phrase in no time moves further to matrix clause from Spec-CP in embedded clause (embedded Spec-CP). The target position is then the newly-merged Spec-CP in matrix clause (matrix Spec-CP). That is, the wh-phrase moves to matrix Spec-CP from embedded Spec-CP in which the wh-phrase leaves behind its another copy  $t_2$ . This displacement property of a phrase is also operative in LD wh-movement; hence, the wh-phrase is interpreted both where it is finally spelled-out and in some other positions (Chomsky, 2013).

LD wh-movement as in (1) does not emerge in a snap in language acquisition. It involves various syntactic operations and necessitates the processing mechanism to be fully operative and readily nativelike. Moreover, economy conditions govern the processing mechanism to begin with less complex and more minimal derivations at the onset of language acquisition. In English, LD wh-movement as a first-language (L1) operation is generally evident at the age of around 4 or 5 (Thornton, 1990), showing an incident of the displacement property of the wh-phrase aforementioned. For English as a second language (L2), LD wh-movement is a hallmark only of advanced learners. Developing learners<sup>1</sup> resort to alternative options in place of LD wh-movement, which are structurally-approximate but still meaningfully-viable. See the example data of the kinds in L1 and L2 English in (2) and (3).

(2) wh-copying in L1 English

- a. **Who** do you think **who** drank the milk? (Thornton, 1990, p.285)
- b. **Who** do you think **who** kicked Cookie Monster? (McDaniel et al., 1995, p.720)
- c. **Which Smurf** do you think **who** has roller skates on? (Thornton, 1995, p.151)

(3) wh-copying in L2 English<sup>2</sup>

- a. **Whose present** do you think **whose present** he likes best?  
(L1 Japanese in Yamane, 2003, p.52)
- b. **Who** do you think **who** lives in the house?  
(L1 Basque/Spanish in Gutiérrez, 2005, p.174)
- c. **Which customer** do you think **who** bought the clothes?  
(L1 Korean in Author, 2012, p.176)
- d. **Who** do you think **who** sent the butter? (L1 French in Slavkov, 2015, p.196)
- e. **Where** do you think **where** John is watching TV?  
(L1 Bulgarian in Slavkov, 2015, p.199)

L1 and L2 studies as above on the acquisition of LD wh-movement exhibit one particular similarity in the course of acquiring the displacement property of the wh-phrase: There is a distinct, extensive interim stage in which the wh-phrase is spelled-out both in matrix Spec-CP as well as in embedded Spec-CP despite the fact that only one wh-phrase has initially merged into the base position. The wh-phrases in (2) and (3) are spelled-out in matrix Spec-CP, and successfully mark the scope as direct wh-questions. Nevertheless, intermediate wh-phrases have also been spelled-out in partial or full copy in embedded Spec-CP (that is, *wh-copying*).<sup>3</sup> Although English constrains its grammar system to maintain the phonological features only of the wh-phrase in matrix Spec-CP in LD wh-movement, developing learners may not perceive this constraint possibly due to processing limitations (Chomsky, 2005) and produce

wh-copying as above. L1 acquisition studies of other languages that employ LD wh-movement also report analogous structures of wh-copying as in (2), although unacceptable such as in French (Oiry and Demirdache, 2006; Strik, 2007; Jakubowicz and Strik, 2008; Jakubowicz, 2011; Oiry, 2011), Spanish (Gutiérrez, 2006), and Greek (Asproudi, 2014), and acceptable only in some dialects of Dutch (Van Kampen, 1997; Jakubowicz and Strik, 2008; Schippers, 2009). In L2 acquisition studies other than English, wh-copying is also evident such as in L2 French (Scheidnes and Tuller, 2010; Strik, 2012), L2 German (Liceras et al., 2011), and L2 Spanish (Liceras et al., 2011, Frank, 2013).

At the same time, these acquisition studies also cite another type of dual wh-phrase in the course of acquiring LD wh-movement, as produced by developing learners. See the example data of the kinds in L1 and L2 English called *wh-scope marking* in (4) and (5).

- (4) wh-scope marking in L1 English
  - a. **What** do you think **which animal** says “woof woof”? (Thornton, 1990, p.237)
  - b. **What** do you think **who** Bert kissed? (McDaniel et al., 1995, p.720)
  - c. **What** do you think **which boy** ate the cookie? (Crain and Thornton, 1998, p.192)
  
- (5) wh-scope marking in L2 English<sup>4</sup>
  - a. **What** do you think **who** loved Yellow? (L1 Japanese in Okawara, 2000, p.53)
  - b. **What** do you think **whose present** he likes best?  
(L1 Japanese in Yamane, 2003, p.101)
  - c. **What** do you think **who** lived in that house?  
(L1 Basque/Spanish in Gutiérrez and Mayo, 2008, p.277)
  - d. **What** do you think **which person** buy this clothes?  
(L1 Korean in Author, 2012, p.174)
  - e. **What** do you think **where** he watch TV? (L1 French in Slavkov, 2015, p.196)
  - f. **What** do you think **who** John kissing? (L1 Bulgarian in Slavkov, 2015, p.199)

Developing learners circumvent LD wh-movement in (1) or wh-copying in (2) and (3). Instead, an expletive kind of wh-phrase occupies matrix Spec-CP to mark the scope as a direct wh-question, such as *what* in (4) and (5). This strategy of dispensing with LD wh-movement per se is rather extraordinary in the sense that no such kind of input has been available to those learners. In English, it is unconceivable that L1 children receive wh-scope marking in the input from their family members. In L2 situations, neither the L1's in (5) nor English employ wh-scope marking. Nevertheless, wh-scope marking is a readily-attested cross-linguistic option to derive a biclausal direct wh-question, such as in Frisian (Hiemstra, 1986), Romani (McDaniel, 1989), Hindi (Dayal, 1994), Hungarian (Horvath, 1997), Polish (Lubańska, 2004), German (Felser, 2004), Passamaquoddy (Bruening, 2006), Russian (Stepanov and Stateva, 2006), Dutch (Barbiers et al., 2010), Warlpiri (Legate, 2011), among others; but not in English. What is even more extraordinary is that although English selects only the option of LD wh-movement, developing learners of English perch on the other two options, wh-copying and wh-scope marking, prior to LD wh-movement. This is normally a transient incident in L1 English, but possibly a persistent or fossilized phenomenon in L2 English.

There is a more elementary kind of scope-marking strategy called *silent-scope marking* (Stepanov, 2000; den Dikken, 2009; Legate, 2011; Schippers and Hoeksema, 2011). Previous studies in L2 report the occurrences of this structure as primary errors, but its persistent, prevalent appearance may insinuate that silent-scope marking is in essence a predetermined,

interim stage as well that emerges in the course of acquiring LD wh-movement. See examples in (6).

- (6) silent-scope marking in L2 English
  - a. Do you think **who** went to Tokyo? (L1 Japanese in Okawara, 2000, p.32)
  - b. Do you think **whose present** he likes best? (L1 Japanese in Yamane, 2003, p.55)
  - c. Do you think **who** bought this clothes? (L1 Korean in Author, 2012, p.174)
  - d. Do you think **where** is Mary? (L1 French in Slavkov, 2015, p.196)
  - e. Do you think **who** Mary sent to buy eggs? (L1 Bulgarian in Slavkov, 2015, p.199)

These structures of silent-scope marking in (6) have been more extensively documented especially from the English learners of Altaic-language speakers such as Japanese and Korean (Okawara, 2000; Wakabayashi and Okawara, 2003; Yamane, 2003, Author, 2012). In Okawara (2000), one of her participants (P11) exclusively opted for silent-scope marking 16 out of 16 trials, while others did from time to time. In Yamane's (2003) elicited data, her Japanese participants produced a significant number of LD wh-movement; while the numbers of wh-scope marking and silent-scope marking were also high alike. According to the data in Author (2012), about 12% of the elicited biclausal structures was silent-scope marking, while LD wh-movement was 46% and wh-scope marking 42%. In a qualitative L1 study, Gutiérrez's (2005, p.234) Spanish data reveal a 100% use of silent-scope marking by Axel (4;9), but it decreased below 20% just 3 months later (5;2) as other options emerge. Silent-scope marking is absolutely ungrammatical, and the existence has never been attested in any natural languages. Native speakers would be confounded by the outputs of silent-scope marking because they are neither yes/no questions nor wh-questions. Yet, its emergence is anticipated.

Based on previous findings and data, this article raises a curiosity. That is, what kinds of biclausal direct wh-questions would then persist if developing learners do not advance linguistic competence and their proficiency remains rather low or frozen? While dealing with English as the target L2 as many previous studies have done, this article presents distinctive English data from adult speakers of Mongolian, a major language of the Altaic family. Unlike the participants in previous studies with L2 English in (5), in general, adult Mongolian speakers had not rather intensively studied English as a foreign language in academic settings and had barely been exposed to genuine conversational situations with native and non-native speakers of English. Their data possibly provide fossilized, clear-cut scope-marking strategies that have not been so clearly manifested for LD wh-movement, wh-copying, wh-scope marking, and silent-scope marking.

This article aims to adopt the Q-based analysis of wh-movement (Kishimoto, 2005; Cable, 2010; Narita, 2012) to explain Internal Merge or External Merge of the wh-phrase into matrix Spec-CP (Chomsky, 2004). More specifically, the working hypothesis is that as the question morpheme Q is unequivocally and spontaneously displaced into matrix Spec-CP according to the syntactic operation of Agree (Chomsky, 2000; Pesetsky and Torrego, 2007), the wh-phrase and its subcomponents *pied-pipe* (or move along with) Q as the language-specific syntactic operation. The subsequent operation of *deletion* eliminates all remnant copies of the wh-phrase pied-piped. We can then arrive at a conclusion that when processing limitations arise during the derivation of LD wh-movement, the wh-phrase pied-piping Q and the deletion of remnant wh-copies may not be entirely operative.<sup>5</sup>

In Section II, I discuss in greater detail the operations of Merge and Agree and narrow down LD wh-movement to the wh-phrase pied-piping Q and the deletion of remnant wh-copies. Of particular relevance is the emergence of wh-copying and wh-scope marking as

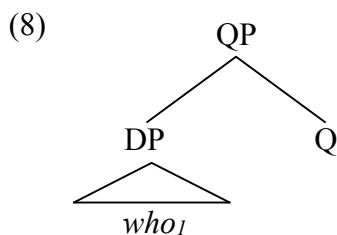
well as silent-scope marking due to processing limitations on pied-piping and deletion. Section III presents the cross-sectional experiment to elicit oral data of LD wh-movement or alternative kinds in English as produced by adult Mongolian speakers. In Section IV, I analyze the data of LD wh-movement, wh-copying, wh-scope marking, and silent-scope marking. Section V discusses the findings from the data. I propose a conclusion that the usual acquisition path can diverge in the course of acquiring LD wh-movement due to the difficulty with the wh-phrase pied-piping Q. As a result, a variety of astonishing scope-marking strategies are sought for by developing learners.

## II Theoretical paradigm for long-distance wh-movement

The theoretical paradigm that this article takes on is the minimalist approach to language acquisition. One principle under this approach assumes that two types of merge operations enter into the computational system of human languages: Internal Merge and External Merge (Chomsky, 2004). Internal Merge feeds a derivation for “discourse-related properties such as old information and specificity, along with scopal effects” (Chomsky, 2008, p.141). Everything else other than Internal Merge is External Merge forming “generalized argument structure” (op. cit.). Now, see (7) for the two structures in which External Merge of *who<sub>I</sub>* has taken place into the base position, in the case of English language.

- (7) a. ... [CP \_\_ [VP *who<sub>I</sub>* loves Julianne]]? (wh-subject movement)  
 b. ... [CP \_\_ [VP Julianne loves *who<sub>I</sub>*]]? (wh-object movement)

Adopting the Q-based analysis of wh-movement (Kishimoto, 2005; Cable, 2010; Narita, 2011), the contentful wh-phrase *who<sub>I</sub>* denoting a question is c-commanded by Question Phrase (QP) whose maximal phrase is headed by a Q(uestion)-morpheme, as in (8).



QP in (8) containing the wh-phrase *who<sub>I</sub>* as determiner phrase (DP) and Q as the phrasal head must move to the sentence-initial position. The motivation for this syntactic move is to value the uninterpretable feature of Q and to mark the structure as a question (Cable, 2010). In doing so, the maximal projection of wh-phrase *who<sub>I</sub>* (that is, DP) pied-pipes (that is, moves along with) Q. (9) represents the two structures in (7) with *who<sub>I</sub>* in the sister-relationship with Q.

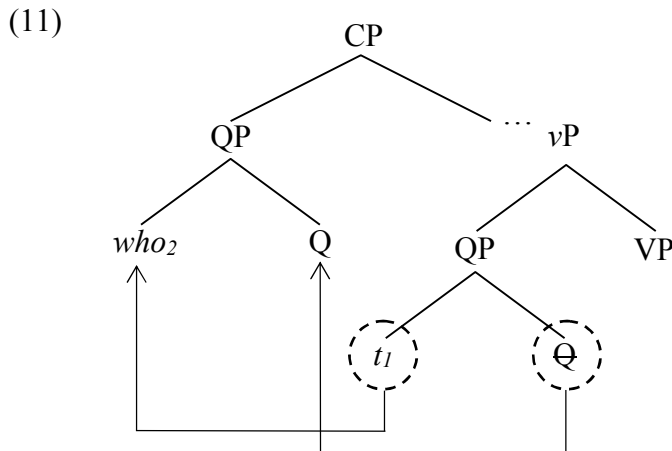
- (9) a. ... [CP \_\_ [VP *who<sub>I</sub>* Q loves Julianne]]? (wh-subject movement)  
 b. ... [CP \_\_ [VP Julianne loves *who<sub>I</sub>* Q]]? (wh-object movement)

Accordingly, in (9), QP containing *who<sub>I</sub>* and Q externally merges into the verb phrase (VP) in embedded clause; into the pre-verbal argument position as an agent in (9a) and into the post-verbal argument position as a patient in (9b).<sup>6</sup> Once the clausal structure is constructed and

the sentence-initial phrase CP is available, Internal Merge in no time directs Q to Spec-CP. Along with the movement of Q, *who*<sub>1</sub> pied-pipes it. Whether this pied-piping is simultaneous or sequential can be a moot point, which will be dealt with in this article. Here, since VPs in (9) with the verb *loves* happen to be transitive, experiencer structures, Internal Merge displaces (or copies) wh-phrases into the transitive VP (i.e. vP) to assign syntactic roles, as Q moves to embedded Spec-CP.<sup>7</sup> See (10).

- (10) a. ... [CP Q [vP *who*<sub>2</sub> [VP *t*<sub>1</sub> loves Julianne]]]? (wh-subject movement)  
 b. ... [CP Q [vP *who*<sub>2</sub> [VP Julianne loves *t*<sub>1</sub>]]]? (wh-object movement)

In (10), as External Merge forms a larger constituent of vP-VP, Internal Merge displaces the wh-phrase from the argument position of V into vP, as leaving behind its wh-copy (*t*<sub>1</sub>).<sup>8</sup> The wh-phrase *who*<sub>2</sub> in (10a) with the theta-role of agent turns into an argument of *loves*, and it endows with the syntactic role of subjectivity on the spot. On the other hand, the wh-phrase *who*<sub>2</sub> in (10b) with the theta-role of patient turns into another argument of *loves*, and it promptly endows with the syntactic role of objectivity. Yet, although theta-theoretic properties have been specified for semantic roles and discourse-related properties have been designated for syntactic roles, the wh-phrases *who*<sub>2</sub> in vP must pied-pipe Q and appear within the same phrase QP in Spec-CP.<sup>9</sup> Eventually, the compound operation of External Merge and Internal Merge derives a legitimate clausal structure as in (11).



The tree diagram in (11) illustrates Internal Merge of Q-morpheme and wh-phrase from the base position to the immediate Spec-CP. Exemplified in (12) are simple wh-questions that are terminated at this moment.

- (12) a. Who Q loves Julianne?  
 b. Who Q does Julianne love?  
 c. Where Q did you see Julianne?

These examples of mono-clausal wh-questions in (12) do not generally inflict considerable complexities on the wh-phrases moving to the sentence-initial position. However, long-distance (LD) wh-movement embraces another full-fledged CP-level clause which c-commands the already-built embedded clause. Syntactic and semantic information pertained within QP in embedded Spec-CP must be in one way or another transferred to matrix clause.

Before the discussion on LD wh-movement between matrix clause and embedded clause, economy conditions will be brought about that govern the computational system (Chomsky, 1995). Naturally, economy conditions would initially trigger to derive a structure with operations that involve the least amount of complexities at the onset of LD wh-movement; hence, constrain the processing mechanism to select “the admissible derivations” (Chomsky, 1995, p.220), not necessarily the grammatical derivations of the language being acquired. When the derivation for LD wh-movement completes up to embedded Spec-CP, QP–containing Q and *who*<sub>2</sub>–must be syntactically active.

To elucidate the wh-movement across the clause boundary, let’s look into the concepts of featural Agree in terms of *probe* and *goal*, also adopted in the minimalist approach to language acquisition. Agree is called for those unvalued features (probes) appended to the head (C) of the newly-merged phrase (CP) with the already-existing constituent (embedded clause) and shares compatible valued features (goals) from the arguments in embedded Spec-CP. Chomsky (2000) specifies that an operation of Agree also enters into the system with External Merge and Internal Merge. Pesetsky and Torrego (2007) further zero in Agree on the share of necessary features for valuation between probe and goal.

(13) Agree (feature sharing version) (Pesetsky and Torrego, 2007, p.265)

An unvalued feature F (a *probe*) on a head H at a syntactic location  $\alpha$  ( $F_\alpha$ ) scans its c-command domain for another instance of F (a *goal*) at location  $\beta$  ( $F_\beta$ ) with which to agree. Replace  $F_\alpha$  with  $F_\beta$ , so that the same feature is present in both locations. (*italic intact*)

In line with Agree in (13), the full-grown matrix clause externally merges with embedded clause, and forms a biclausal structure to derive LD wh-movement. Some unvalued features on the phrasal head C of matrix CP serve as *probes* and scan their c-command domain; that is, embedded Spec-CP for *goals* to share matching features.<sup>10</sup> In matrix CP, the head C naturally bears unvalued features. One of those features is called “edge-feature [EF],” which is automatically available to a lexical item (Chomsky, 2008, p.140), and requires its unvalued Q-feature to be valued. C then turns into an active probe in search of embedded Spec-CP for a matching feature to share with [EF]; that is, the Q-morpheme.<sup>11</sup>

When Agree takes place between [EF] and Q and Q in no time moves to matrix Spec-CP, the biclausal structure operates as a direct question, as in (14), but *not yet* as a direct wh-question per se (*italic emphasized*). The structures of silent-scope marking in (14) exhibit the instant that Q as probed by [EF] internally moves to matrix Spec-CP, but *who*<sub>2</sub> has not pied-piped it, say, for developing learners.<sup>12</sup>

- (14) a. [<sub>CP</sub> \_\_ Q do you think [<sub>CP</sub> *who*<sub>2</sub> Q *t*<sub>I</sub> loves Julianne]]?  
 b. [<sub>CP</sub> \_\_ Q do you think [<sub>CP</sub> *who*<sub>2</sub> Q Julianne loves *t*<sub>I</sub>]]?

These are syntactically admissible outcomes that enclose the contentful wh-phrase *who* failing to pied-pipe Q and being stranded in embedded Spec-CP (Stepanov, 2000; den Dikken, 2009; Legate, 2011; Schippers and Hoeksema, 2011). Q has been probed by [EF] and marks the structure as a question in matrix Spec-CP, while *who* maintains its syntactic and semantic roles overtly in embedded Spec-CP. Although syntactically efficient, silent-scope marking is semantically dubious whether it is a polar question calling for a yes/no answer or a wh-question calling for a variable answer (Bailey, 2013). Probably due to this reason, there are no natural languages that employ the strategy of silent-scope marking. As processing

limitations on the wh-phrase pied-piping Q decrease in silent-scope marking, matrix Spec-CP can accommodate the QP containing Q and the wh-phrase as a legitimate direct wh-question.

Nevertheless, although matrix Spec-CP holds a legitimate QP, there still remains a remnant operation: *deletion*. See (15), where deletion fails in embedded Spec-CP.

- (15) a. [<sub>CP</sub> *Who* Q do you think [<sub>CP</sub> *who* loves Julianne]]? (wh-subject copying)  
 b. [<sub>CP</sub> *Who* Q do you think [<sub>CP</sub> *who* Julianne loves]]? (wh-object copying)

In (15), the probe [EF] agrees with the goal Q and, in no time, attracts it to matrix Spec-CP, and the wh-phrase *who* successfully pied-pipes Q. Yet, the wh-phrase *who* spells-out both in matrix Spec-CP and in embedded Spec-CP, and the structure of wh-copying emerges (Lutz et al., 2000; Felser, 2004; Bruening, 2006; Pankau, 2013). In fact, it is the latter copy *who* in embedded Spec-CP that disregards the deletion of its phonological features. Refer (16) to the properties of copy.

- (16) K is a copy of L if K and L are identical except that K lacks the phonological features of L. (Chomsky, 2004, p.113)

Failure to delete copies is a violation of (16).<sup>13</sup> Two copies must not have the identical phonetic values if they are syntactically and semantically identical. This is “a serious of violation: a case of imperfection” (Chomsky, 2000, p.111) that the spell-out proceeds without the operation of phonological deletion of remnant copies. On the contrary, if two copies have the identical phonetic values, but they are syntactically and semantically *distinctive*, it is *not* a violation then. For wh-copying, the computational system can divide the dual role imposed on the contentful wh-phrase: scope-marking to the wh-copy in matrix Spec-CP and theta-marking to the wh-copy in embedded Spec-CP. In (15), *who* in matrix Spec-CP marks the structure as a direct wh-question. Its wh-copy phonetically survives in embedded Spec-CP and retains theta-marking, which can ease the dual role imposed on the wh-copy in matrix Spec-CP. Partaking of the dual role manifested on the wh-phrase is in fact typologically attested. A number of natural languages allow the strategy of wh-copying—Afrikaans (du Plessis, 1977), Frisian (Hiemstra, 1986), Romani (McDaniel, 1989), German (Felser, 2004; Fanselow, 2006), Dutch (Schippers, 2009), etc.<sup>14</sup> Wh-copying is ungrammatical in adult English, but it is an admissible syntactic option that is evident in child English (Thornton, 1990; McDaniel et al., 1995; Crain and Thornton, 1998).

When the wh-phrase does not pied-pipe Q or fails to do so, an expletive kind of wh-feature externally merges to matrix clause and subsequently moves to the vacant DP slot for a wh-phrase next to Q in QP. And it can be assigned the phonetic values as *what*. See (17).

- (17) a. [<sub>CP</sub> *What* Q do you think [<sub>CP</sub> *who* loves Julianne]]? (wh-subject-scope marking)  
 b. [<sub>CP</sub> *What* Q do you think [<sub>CP</sub> *who* Julianne loves]]? (wh-object-scope marking)

These structures of wh-scope marking in (17) are occupied with the wh-expletive *what*, which is simply a semantically-void placeholder but its syntactic role is viable (Dayal, 1994; Lutz et al., 2000; Stepanov, 2000; Bruening, 2006; Stepanov and Stateva, 2006; Legate, 2011, among others).<sup>15</sup> It salvages the matrix clause out of being a polar question as in (14), and marks the structure as a sort of direct wh-question.

Wh-scope marking in English can be an alternative structure that occurs when the contentful wh-phrase in embedded Spec-CP fails to pied-pipe Q to matrix Spec-CP. This admissible structure alternative to the intended LD wh-movement is absolutely



ungrammatical in adult English, but often reported from child L1 English and exclusively prevalent in adult L2 English. In fact, there are quite a few natural languages attested to permit wh-scope marking as an acceptable structure such as in Frisian (Hiemstra, 1986), Romani (McDaniel, 1989), Hindi (Dayal, 1994), Hungarian (Horvath, 1997), Polish (Stepanov, 2000; Lubańska, 2004), German (Felser, 2001, 2004), Russian (Stepanov and Stateva, 2006), Dutch (Barbiers et al., 2010), among others. Less known languages such as Passamaquoddy (Bruening, 2006) and Warlpiri (Legate, 2011) also employ wh-scope marking.<sup>16</sup> Some of these languages (Frisian, Romani, German, Dutch) allow wh-copying and wh-scope marking along with LD wh-movement, while others exclusively select only wh-scope marking and dispense with wh-copying and LD wh-movement as in Passamaquoddy and Warlpiri. Moreover, some languages select *what* as the wh-expletive, while others select *how* (Polish, Russian, Warlpiri).

LD wh-movement, wh-copying, and wh-scope marking—they all discretely and overtly mark matrix Spec-CP to be direct wh-questions on their own, except for silent-scope marking. Computational complexities pertinent to the wh-phrases marking their scopes can be examined in terms of the operations of *pied-piping* and *deletion*. See (18).

- (18) a. [CP *Who* Q do you think [CP ~~*who*~~ Julianne loves]]? (LD wh-movement)  
 b. [CP *Who* Q do you think [CP *who* Julianne loves]]? (wh-copying)  
 c. [CP *What* Q do you think [CP *who* Julianne loves]]? (wh-scope marking)  
 d. [CP \_\_ Q do you think [CP *who* Julianne loves]]? (silent-scope marking)

Pied-piping represents the movement of the wh-phrase with Q into matrix Spec-CP from embedded Spec-CP. Deletion denotes the elimination of phonological features from the remnant wh-copy in embedded Spec-CP after the wh-phrase pied-pipes Q. LD wh-movement, the kind employed in adult English, undergoes both operations; pied-piping and deletion. Wh-copying goes through pied-piping but not deletion whether it be in partial or in full, but neither operations in wh-scope marking are needed. These kinds of operations do not exist for silent-scope marking. We can then juxtapose the operations of pied-piping and deletion as for the four structures. See Table 1.

**Table 1.** Operations of pied-piping and deletion in LD wh-movement, wh-copying, wh-scope marking, and silent-scope marking

	LD wh-movement	wh-copying	wh-scope marking	silent-scope marking
Pied-piping	○	○	×	∅
Deletion	○	×	×	∅

○ = necessary, x = unnecessary, ∅ = non-existent

We can then conjecture that computational complexities are gradually alleviated in the order of silent-scope marking, wh-scope marking, wh-copying, and LD wh-movement. One may raise a doubt concerning wh-scope marking that the wh-expletive externally merged into matrix clause may exert extra complexities on syntactic operations. Nevertheless, Pesetsky and Torrego (2007) allege that External Merge into base structure comes free and Internal Merge to yield discourse-related properties is subject to a relation that can be a cost among computational objects. Taking this claim into account, External Merge of the wh-expletive in wh-scope marking is exempted from computational complexities. On the other hand, Internal

Merge of the wh-phrase pied-piping Q in LD wh-movement and wh-copying can be subject to computational complexities. Undetermined at the moment is whether the syntactic operation of deletion—elimination of the phonological features from the remnant wh-copy—can also be subject to computational complexities.

An immediate question arises. That is, whether the structures involving less computational complexities would block other structures involving more computational complexities by virtue of economy conditions. If so, would LD wh-movement, wh-copying, wh-scope marking, and silent-scope marking emerge in different stages of language acquisition? The answer to this question can support the idea that economy conditions govern the processing mechanism to start off with less complex options at the onset of language acquisition (Chomsky, 2000).

Economy conditions also regulate the wh-phrase to be linguistically as minimal as possible during the operation of pied-piping Q, since being minimal equates with being less complex. As the wh-phrase pied-pipes Q to matrix Spec-CP to derive LD wh-movement, this condition also applies to the complex wh-phrase as in (19).

- (19) [<sub>CP</sub> *Pictures of whose mother* Q did you think [<sub>CP</sub> *t* were on the mantelpieces]]?  
(Chomsky, 1995, p.269)

The pied-piped phrase in (19) is obviously the complex wh-phrase *pictures of whose mother*. The displacement of its subcomponent *whose mother* is in fact syntactically good enough to mark the structure as a wh-question. This would be more minimal (i.e. less complex) than carrying the larger phrase *pictures of whose mother*, regardless of grammaticality. In turn, a more minimal element than *whose mother* is to displace just the wh-phrase *who*, leaving behind its complement *'se mother* along with the dominating phrase *pictures of*. In essence, the optimally minimal element needed to generate a wh-question in (19) that the processing mechanism “looks at” is only the wh-feature [WH] pertained to *who*, not the lexical item *who* itself or *whose*, *whose mother*, etc. (op. cit.). Preferably, the minimal element should be displaced when the wh-phrase pied-pipes Q, as per economy conditions. Yet, it is the language-specific properties of adult English in (19) exerting constraints on syntactic operations (i.e. being more complex) that “see” and carry more elements than needed (op. cit.), probably because the minimal wh-feature [WH] cannot assign proper phonological features.

Reflecting on economy conditions necessitating minimal elements to be displaced, computational complexities intrinsic to LD wh-movement, wh-copying, wh-scope marking, and silent-scope marking can be measured in terms of the number of elements being displaced along with the wh-phrase pied-piping Q. See (20) for LD wh-movement.

- (20) LD wh-movement  
a. [<sub>CP</sub> *Which boy* Q do you think [<sub>CP</sub> ~~*which boy*~~ Julianne loves]]?  
b. [<sub>CP</sub> *Which* Q do you think [<sub>CP</sub> ~~*which*~~ (*boy*) Julianne loves (*boy*)]]?  
c. [<sub>CP</sub> *Who* Q do you think [<sub>CP</sub> ~~*which boy*~~ Julianne loves]]?

English requires the entire complex wh-phrase *which boy* to pied-pipe Q as in (20a). Processing limitations can tackle this option for less complex derivations, however. To mark the scope with a wh-phrase, minimal but viable elements carrying the wh-feature [WH] may, theoretically and possibly, pied-pipe Q to matrix Spec-CP. For instance, in (20b), only the definite wh-determiner *which* pied-pipes Q, while its c-command NP *boy* remains in the base position or in embedded Spec-CP. In (20c), the indefinite animate wh-phrase *who* pied-pipes

Q, which is possibly the spell-out of a morphological compound of the wh-feature [WH] from *which* and the [+human] feature from *boy* (Halle and Marantz, 1993). Economy conditions may set off the processing mechanism at the onset to displace the less number of necessary elements; hence, (20b) and (20c) may appear prior to (20a). Further, (20c) may emerge before (20b).

In wh-copying that emerges when the operation of deletion is absent, the wh-phrases occupy both in matrix Spec-CP and in embedded Spec-CP, as in (21a). Possible variants are contrived beneath.

(21) wh-copying

- a. [CP *Which boy* Q do you think [CP *which boy* Julianne loves]]?
- b. [CP *Which boy* Q do you think [CP *which* Julianne loves]]?
- c. [CP *Which boy* Q do you think [CP *who* Julianne loves]]?
- d. [CP *Who* Q do you think [CP *which boy* Julianne loves]]?
- e. [CP *Which* Q do you think [CP *which boy* Julianne loves]]?

When the needs arise to sustain the same wh-phase in each Spec-CP as in (21a), the processing mechanism evades the deletion of the entire complex wh-phrase *which boy*. A more minimal but still necessary lexical element carrying the wh-feature [WH] that can be extracted from *which boy* seems to be *which* or *who*. Possible wh-copying variants of these kinds are listed in (21b-e). Economy conditions prefer initially to displace the less number of necessary elements; hence, (21d) and (21e) may appear prior to the variants in (21a-c) where more elements pied-pipe Q to matrix Spec-CP. If economy conditions affect pied-piping, the wh-phrase in matrix Spec-CP should be morphologically more minimal (i.e. less complex) than the wh-phrase in embedded Spec-CP at the onset of acquiring LD wh-movement and wh-copying.

(22) wh-scope marking

- a. [CP *What* do you think [CP *which boy* Julianne loves]]?
- b. [CP *What* do you think [CP *which* Julianne loves]]?
- c. [CP *What* do you think [CP *who* Julianne loves]]?

For wh-scope marking as in (22a), no computational complexities at issue arise since this structure does not necessitate the operation of pied-piping Q across the clause boundary; hence, no operation of deletion either. If pied-piping as a movement operation is subject to a syntactic cost (Pesetsky and Torrego, 2007), the cost is imposed only on LD wh-movement and wh-copying, not on wh-scope marking. Nevertheless, due to the processing constraints on wh-movement within the embedded clause, more minimal elements than *which boy* may situate in embedded Spec-CP, as in (22b, c). Below in (23) are listed some variants of silent scope marking.

(23) silent-scope marking

- a. [CP Do you think [CP *which boy* Julianne loves]]?
- b. [CP Do you think [CP *which* Julianne loves]]?
- c. [CP Do you think [CP *who* Julianne loves]]?

Silent-scope marking takes in syntactically the most economical derivation to mark matrix Spec-CP if we argue that theoretically only the minimal wh-feature [WH] pied-pipes Q. As economy conditions govern the processing mechanism, developing learners are expected

initially to start off with silent-scope marking before the others; possibly, wh-scope marking next and then followed by wh-copying before finally deriving the proper LD wh-movement.

### III The experiment

#### 1 Research questions and LD wh-movement in Mongolian

The primary interest of this article is to investigate whether more economical derivations predate less economical ones in the acquisition of LD wh-movement. Based on this broad agenda, more specific research questions can be proposed. First, do biclausal structures—wh-copying, wh-scope marking, silent-scope marking—emerge in place of LD wh-movement? Second, do advanced learners make the wh-phrase pied-pipe Q more frequently than developing learners; in other words, do advanced learners employ more of LD wh-movement, while do developing learners employ more of alternative structures? Third, is the weight of wh-phrase lighter as it attempts to pied-pipe Q toward the sentence-initial position? In other words, is the weight of wh-phrase in LD wh-movement lighter than in wh-copying, which is in turn lighter than in wh-scope marking and also than in silent-scope marking? Do advanced learners make heavier wh-elements pied-pipe Q compared with developing learners? Predictions about these research questions can be made, according to the theoretical discussion brought up in the previous section. Regarding the research question 1, economy conditions predicts that LD wh-movement may not be easily evidenced from developing L2 learners of English because of rather higher processing complexities in LD wh-movement involved than in others. Similarly, for the research question 2, it is expected that as the English proficiency increases, the wh-phrase can more frequently and also successfully settle in matrix Spec-CP; hence, more of LD wh-movement may emerge. As for the research question 3, when the wh-phrase pied-pipes Q, learners may initially derive the least possible (or the lightest) elements involved in the wh-phrase, although there are more elements that need to be displaced. As the English proficiency increases, the more number of (or heavier) elements would pied-pipe Q.

Next I will briefly introduce the target L1, Mongolian, in terms of its word order and wh-movement. Just like other Altaic languages such as Turkish (Çelik-Yazici, 2007), Japanese (Watanabe, 1992), Korean (Hong, 2005), etc., Mongolian has an overt word-order of subject-object-verb (SOV) and the wh-phrase is spelled-out in the base position (Dolgormaa, 2014), as in (24).

- (24) [CP Chi [CP Yuna yu-g hudaldaj av-san gej] bodoj-baina ve]?  
           you Yuna what-ACC buy take-PAST C think-PROG Q  
           ‘What do you think Yuna buy-to-own?’ (Lit. *What do you think Yuna buy?*)

As in English, Q as the goal is probed by [EF] and eventually moves to matrix Spec-CP. Unlikely in English, however, Q is overtly spelled-out as *ve* in Mongolian with a rising tone. The wh-phrase in Mongolian does not move; hence, the wh-phrase *yu-g* ‘what’ remains in its originally-merged position in embedded clause and is spelled-out in situ. The embedded clause manifests an overt word-order of SOV *Yuna* (SUB) *yu-g* (OBJ) *hudaldaj av-san* (VERB), and the matrix clause also holds an overt word-order of SOV *Chi* (SUB) *embedded CP* (OBJ) *bodoj-baina* (VERB). When Mongolian adults acquire English as an L2, they may have difficulty making the wh-phrase pied-pipe Q, because the non-movement option in L1 is syntactically less complex (or simpler) than the movement option in L2, according to

economy conditions. Also, Mongolian marks the scope of wh-question with an overt phonetic spell-out of Q, while English does it with the wh-phrase pied-piping the phonetically-silent Q. This interesting juxtaposition of Q and wh-phrase in Mongolian and English can be a complex syntactic-maze for Mongolian adults.

## 2 Participants

In order to collect a sufficient amount of quantitative data from the participants, the target had to be Mongolian natives who have at least had a number of years of English education and acquired the working knowledge of wh-movement in English as their primary L2. Moreover, they also had to be mature enough to tolerate a 15-minute length of controlled experimental situation. For these reasons, university students were targeted. The experiment was scheduled with the participants from various majors in the Humanities School of the National University of Mongolia in Ulaanbaatar. However, when there seemed to be no more participants available after about 10 days, the experiment was wrapped up with the final number of 97. They were between 19 and 23 years old (female = 94, male = 3, mean age = 20, sd = 0.95). A self-reported questionnaire in Mongolian was filled out to collect bio-data and information on language backgrounds. Also asked for was a short grammar quiz in English with the maximum point of 20 (max = 16, min = 1, average = 10.10, sd = 3.48), whose purpose was to classify the participants into two levels: 48 in HIGH, 49 in LOW. The control group with native speakers who comprehended Mongolian could not be available. Instead, the Mongolian stimuli translated into Korean, a language with exactly the same structure and grammar, were employed by nine Korean heritage or near-native speakers of English.

## 3 Experimental task

A cross-sectional oral-translation method was designed to acquire a sufficient amount of data for the target structures within a single experimental session. This sort of elicitation task enables the experiment to evoke intricate syntactic structures that are not commonly used, such as LD wh-movement. Furthermore, a production task rather than a competence task has been designed because it can elicit the intended structure more directly than, say, a processing or comprehension task, as Crain and Thornton (1998) claim that correct derivations from the lexicon do not take place by accident.

The experiment had prepared a series of twelve video-scenes (seven tokens and five fillers), and on each scene, a person asked a question in Mongolian to the other person. The participant had to translate the question into English. The content of each scene was thoughtfully formulated with necessary functional words in Mongolian to draw out LD wh-movement in English. Table 2 lists the token sentences translated into English. The order of presenting each scene was mixed with fillers, and a different series of video-scenes but with exactly the same syntactic structures was alternatively employed to minimize the ordering effect.

**Table 2.** Target LD wh-questions in English

indefinite	subject	<b>Who</b> do you think <del>who</del> killed William?
	object	<b>Who</b> do you think Julianne likes <del>who</del> ?
	adjunct	<b>Where</b> do you think we had lunch <del>where</del> ?
definite	subject	<b>Which person</b> do you think <del>which person</del> saw Jessica?
	object	<b>Which person</b> do you think Thomas hit <del>which person</del> ?
	adjunct	<b>In which cinema</b> do you think I saw the movie <del>in which cinema</del> ?

In Table 2, a variety of LD wh-questions were contrived based on definiteness (indefinite, definite) and grammatical positions (subject, object, adjunct). The wh-word *what* was avoided because it would be unsure whether *what* in wh-scope marking was the expletive *what* or the contentful *what*; instead, *who* was selected along with its definite counterpart *which person*. *Where* and *In which cinema* were selected as adjuncts. The response time was set for ten to twelve seconds before the next scene came up after a bell sound.

## IV Results

While every member in the control group produced LD wh-movement, each of the 97 participants endeavored to produce the six experimental tokens in Table 2. Those participants who could not produce even a single biclausal structure (LD wh-movement, wh-copying, wh-scope marking, or silent-scope marking) were in essence quite a few: 20 from HIGH and 27 from LOW. Moreover, I singled out those who produced just one biclausal structure because one out of six chances was rather fortuitous: 6 from HIGH and also another 6 from LOW. Although this elimination would dismally decrease the probability of detecting a statistical result when there are differences between HIGH and LOW, the data would reveal a clearer, more persuasive prototype of the wh-phrase pied-piping Q. Hence, further analysis was carried out with the data from the remaining participants (HIGH = 22, LOW = 16), from whom a total of 128 biclausal structures were elicited. Frequencies and percents of LD wh-movement, wh-scope marking, and silent-scope marking are arranged in the contingency table below (Table 3), as the participants are classified into HIGH and LOW. Elicited examples are listed in below in (25)–(27). Any sort of wh-copying aforementioned was not elicited at all. Instead, wh-copying within the embedded clause was often evidenced such as *What do you think who Thomas kick who?* (P39) and *Do you think who Thomas kicked whom?* (P83). To analyze the elicited data, non-parametric statistics were performed in this study.

Table 3. Output summary of LD wh-movement, wh-scope marking, and silent-scope marking

	LD wh-movement	wh-scope marking	silent-scope marking	total
HIGH	11 (14.1%)	44 (56.4%)	23 (29.5%)	78 (100.0%)
LOW	2 (4.0%)	27 (54.0%)	21 (42.0%)	50 (100.0%)
ALL	13 (10.1%)	71 (55.5%)	44 (34.4%)	128 (100.0%)

(25) LD wh-movement (errors intact)

- a. **Who** do you think love Julia? (P53)
- b. **Who** do you think William killed? (P46)
- c. **Where** do you think we went to dinner last night? (P55)
- d. **Which people** do you think Jessica see? (P53)
- e. **Which cinema** do you think I saw a movie? (P46)

(26) wh-scope marking

- a. **What** do you think **who** love Julia? (P26)
- b. **What** do you think about **where** we had lunch? (P7)
- c. **How** do you think about **which person** seen Jessica (P4)
- d. **What** are you thinking about **what person** did hit Thomas? (P76)
- e. **What** do you think **which cinema** I watched movie (P49)

- (27) silent-scope marking
- a. Do you think **who** like Julia? (P51)
  - b. Do you think **where** we eat dinner? (P40)
  - c. Do you think **which person** look Jessica? (P83)
  - d. Do you think about **who** Thomas hits (P15)
  - e. Do you think about **which cinema** I watch movie? (P15)

### *1 LD wh-movement, wh-scope marking, and silent-scope marking*

In Table 3, the participants (ALL) produced the grammatical LD wh-movement, but the frequency was rather low (10.1%), alluding to the fact that their English proficiency was low in general. For these participants, the wh-phrase pied-piping Q to matrix Spec-CP must have posed processing complexities. Nevertheless, the operation of deletion did not seem to be a burden, because not a single case of wh-copying occurred. Those participants who could not produce LD wh-movement, perched on other alternative biclausal structures. They called on wh-scope marking more than some half productions (55.5%). The expletive *what*, or the expletive *how* in a few cases, marked the syntactic scope as merged into matrix Spec-CP, and the contentful wh-phrase was spelled-out in embedded Spec-CP. Relatively, a high frequency of silent-scope marking was produced (34.4%). It can be assumed that the wh-expletives were unavailable in the lexicon of those participants who depended on silent-scope marking. A one-way goodness-of-fit chi-square test revealed that LD wh-movement was distinctively frequent, but wh-scope marking and silent-scope marking were more frequently selected, meaning that these two ungrammatical structures emerged in place of LD wh-movement ( $\chi^2 = 39.484, p = .000$ ).

### *2 LD wh-movement and L2 proficiency*

The Wilcoxon signed-ranks test assessed the difference between HIGH and LOW in terms of wh-movement type, as shown in Table 3. The results were statistical ( $Z = -5.477, p = .000$ ). A further test was conducted to see the difference between HIGH and LOW for the productions of each LD wh-movement, wh-scope marking and silent-scope marking based on the following 2 x 2 contingency tables (Tables 4–6). Also, to intuitively understand the results and the strengths of the difference (Howell, 2002), odds ratios have been calculated.

Table 4. Proficiency vs. LD wh-movement

	LD wh-movement	others
HIGH	11	67
LOW	2	48

In Table 4, the difference between HIGH and LOW for the production of LD wh-movement was statistical ( $Z = -3.000, p = .003$ ). The odds of producing LD wh-movement for HIGH were roughly four times greater than for LOW (odds ratio =  $(11 \times 48) \div (2 \times 67) = 528 \div 134 = 3.9$ ), meaning that the participants would be four times as likely to have high proficiency be in HIGH than in LOW if they produce a structure with LD wh-movement.

Table 5. Proficiency vs. wh-scope marking

	wh-scope marking	others
HIGH	44	34
LOW	27	23

In Table 5, the difference between HIGH and LOW for the production of wh-scope marking was statistical ( $Z = -4.123$ ,  $p = .000$ ). The odds of producing wh-scope marking for HIGH were 1.1 times greater than for LOW (odds ratio =  $(44 \times 23) \div (27 \times 34) = 1012 \div 918 = 1.1$ ). The participants would be somewhat (1.1 times) as likely to be in HIGH than in LOW if they produce a structure with wh-scope marking.

Table 6. Proficiency vs. silent-scope marking

	silent-scope marking	others
HIGH	23	55
LOW	21	29

In Table 6, the difference between HIGH and LOW for the production of silent-scope marking was not statistical ( $Z = -1.414$ ,  $p = .157$ ). The odds of producing silent-scope marking for HIGH were 0.6 times less than for LOW (odds ratio =  $(23 \times 29) \div (21 \times 55) = 667 \div 1155 = 0.6$ ). In other words, the participants would be about twice as likely to be in LOW than in HIGH if they produce a structure with silent-scope marking.

### 3 L2 proficiency and weight of the wh-phrase

The participants (ALL) were given three LD definite wh-questions in Table 2. Sometimes, they produced the wh-phrases with proper definiteness; other times, it was overlooked and indefinite wh-phrases emerged. The frequency counts of each LD wh-movement, wh-scope marking, and silent-scope marking are given in Table 7, as categorized into DEF and INDEF. While the frequencies for LD wh-movement seem low to compare (four for INDEF and two for DEF), definiteness is split nearly 50:50 for wh-scope marking (19 for INDEF and 17 for DEF) but is apparent for silent-scope marking (three for INDEF and 20 for DEF).

Table 7. Definiteness and LD wh-structures

	LD wh-movement	wh-scope marking	silent-scope marking
INDEF	4	19	3
DEF	2	17	20

The Wilcoxon signed-ranks test was conducted to see the difference between INDEF and DEF arising from the types of LD wh-structures, based on the data in the contingency table above. The results were statistical ( $Z = -2.449$ ,  $p = .014$ ). A further test was performed to see the difference between HIGH and LOW in terms of selecting the definiteness. A contingency table for these data is shown below in Table 8.

Table 8. Proficiency and definiteness

	INDEF	DEF
HIGH	20	20
LOW	6	19

In Table 8, the results were statistical ( $Z = -3.742$ ,  $p = .000$ ). The odds of producing indefinite wh-phrases for HIGH were more than three times greater than for LOW (odds ratio =  $(20 \times 19) \div (20 \times 6) = 380 \div 120 = 3.2$ ). The participants would be about roughly three time



as likely to be in HIGH than in LOW if they produce an indefinite LD wh-structure instead of the actual definite LD structure.

To summarize the results, probably because the participants were not very advanced learners of English, LD wh-movement had to be a formidable derivation for them. As alternative structures, both wh-scope marking and silent-silent scope marking predominantly emerged, although those are ungrammatical in English. According to the statistics, it suggests that LD wh-movement and wh-scope marking were the hallmarks for HIGH, while silent-scope marking was not. Moreover, HIGH sacrificed definiteness of the wh-phrase pied-piping Q in order to process more complex wh-movement: LD wh-movement and wh-scope marking. On the other hand, LOW preserved definiteness and produced the least complex wh-movement: silent-scope marking.

## V Discussion

The results of the present experiment endorse the fact that more economical derivations emerge prior to less economical ones in the acquisition of LD wh-movement. With respect to the research questions, the Mongolian participants primarily depended on wh-scope marking as employing the wh-expletive in matrix Spec-CP and spelling-out the contentful wh-phrase in embedded Spec-CP, which is an ungrammatical. Yet, this option is more economical in the sense that it is liberated from Internal Merge of the wh-phrase penetrating the clause boundary and takes on External Merge of the wh-expletive *not* penetrating the clause boundary. Quite a few participants whose lexicon was devoid of the wh-expletive could not produce wh-scope marking brought about silent-scope marking, which involves no syntactic and semantic merge of the wh-phrase between matrix clause and embedded clause. Hence, not to mention LD wh-movement, wh-scope marking was largely the hallmark for more proficient participants, while silent-scope marking was for less proficient ones. In other words, advanced learners possess the processing mechanism that can make the wh-phrase pied-pipe Q or the wh-expletive appear in matrix Spec-CP, while developing learners does not.

Regarding the weight of the wh-phrase pied-piping Q, a characteristic behavior for more proficient participants was that, insofar as possible, they carried a minimal wh-phrase (e.g. *who* or *where*) to mark the scope to matrix Spec-CP when the entire complex wh-phrase (e.g. *which person* or *at which hotel*) could not pied-pipe Q out of embedded Spec-CP. For less proficient participants, they could not displace any less items than the entire wh-phrase; hence, the wh-phrase remained in embedded Spec-CP, which consequently gave rise to silent-scope marking. In other words, when the entire wh-phrase cannot pied-pipe Q penetrating the clause boundary for Internal Merge, advanced learners attempt to carry lighter elements containing the wh-phrase; while developing learners stagnate with the whole wh-phrase frozen on the spot (Rizzi, 2010).

Emergence of these alternative structures in L2 English has been reported in acquisition literature, as documented in Section I. In general, silent-scope marking as the earliest spell-out of LD wh-movement is produced by developing learners. Beginning or less intermediate learners cannot even derive a biclausal structure containing a wh-phrase. Nevertheless, such an extensive dependence on wh-scope marking by the Mongolian participants must be explained for its syntactic motivation and semantic denotation, because neither Mongolian as L1 nor English as L2 does not draw out the wh-expletive as an independent lexical item, which, however, surfaced predominantly in the Mongolian-English interlanguage.

In the course of producing a structure with LD wh-movement as the participants intended at first, the Agree operation took place between the probe [EF] in matrix C and the goal Q (Pesetsky and Torrego, 2007; Chomsky, 2008), but only Q spontaneously moved to matrix Spec-CP as isolating the wh-phrase in embedded Spec-CP (Cable, 2010; Narita, 2011). A speculative account can be proposed on this issue. When the derivation arrived at a point to overtly displace the wh-phrase into matrix Spec-CP, the processing mechanism reached to the limit and terminated. It seems that once the derivation completed a contentful clausal structure—a CP level, further syntactic operations beyond the CP were no longer possible. Adopting Den Dikken (2009), any movement to Spec-CP must have been terminal for those participants (34.4%), meaning that when all probes in CP were satisfied after Agree, this CP then became deactivated.<sup>17</sup> Although word order was wrong, the intended meaning could be carefully inferred from the lexical items. Hence, although the wh-phrase moved to embedded Spec-CP, it had to be spelled-out there, as in (28).

- (28) a. Do you think **who** like Julia? (P51)  
 b. Do you think **which person** look Jessica? (P83)

In no time, the participants knew that the wh-phrase had to be overtly realized in matrix Spec-CP because the otherwise silent-scope marking could have only been dubious interrogative structures, neither polar questions nor wh-questions. Yet, the CP-level syntactic operations had been deactivated in their L2 English. When Internal Merge of the wh-phrase could not take place, External Merge materialized as drawing out the wh-expletive *what* or *how* with no semantic import. Accordingly, the wh-expletive merged into matrix clause and marked the structure as wh-scope marking (55.5%), as in (29).

- (29) a. **What** do you think **who** love Julia? (P26)  
 b. **What** do you think **which cinema** I watched movie (P49)

The strategy of employing the wh-expletive to produce wh-scope marking in L1 and L2 English has been mentioned earlier, but the discussion insofar as how the wh-expletive happens to situate in matrix Spec-CP has been lacked in the acquisition studies. In syntax, the wh-expletive *what* as a lexical item is assumed to be externally merged directly into matrix Spec-CP from the lexicon (McDaniel, 1989; a group of authors in Lutz et al., 2000). The wh-expletive is devoid of semantics, and works just like weather-*it* (e.g. It is cool.) or day-*it* (e.g. It is Monday.), as occupying the syntactic subject-position. The wh-expletive syntactically marking the scope in matrix Spec-CP and the contentful wh-phrase preserving the semantic properties in embedded Spec-CP are associated with each other as forming a dependency chain. This concept is analogous to the *there*-associate construction such as *There come animals onto the stage*. The expletive *there* syntactically occupies the subject position, but the verb *come* agrees with *animals* as the semantic subject. This approach provides a very neat explanation about the dual wh-phrases in wh-scope marking forming a dependency chain (Rizzi, 2006), and fits the claim proposed by den Dikken (2009) that every Spec-CP is the terminal point.

Nevertheless, the following data in (30) with the preposition *about* in matrix clause make it difficult to believe that the wh-expletive is directly merged into matrix Spec-CP, but initially into the matrix VP.

- (30) a. **What** do you think *about* **where** we had lunch? (P7)  
 b. **What** are you thinking *about* **what person** did hit Thomas? (P76)

These kind of data have also been reported in previous studies; more noticeably in L2 English. For the Mongolian participants, the construction *what—about* in matrix clause occurred 26 out of the total of 71 counts (36.6%). Cheng (2000) and Cole and Hermon (2000) in the volume edited by Lutz et al. (2000) argue that the wh-expletive is the phonetic realization of the minimal wh-feature [WH] of the contentful wh-phrase in embedded Spec-CP. The wh-feature [WH] is spelled-out as *what* in English. The wh-expletive *what* is the default wh-word (Radford, 2009), and it is syntactically sufficient enough to mark the scope of a wh-question (Cheng, 2000). Again, the data in (30) show that the wh-expletive has no direct relationship with the contentful wh-phrase in embedded Spec-CP. Not only their approach contradicts the analysis by den Dikken (2009) because the wh-feature [WH] is argued to escape out of embedded Spec-CP, but the data with the wh-expletive *how* in (31) perplexes us by its possible association with the contentful wh-phrase in embedded Spec-CP.

- (31) a. **How** do you think about **who** loves Julia? (L1 Mongolian, P4)  
 b. **How** do you think about **which person** seen Jessica? (L1 Mongolian, P4)  
 c. **How** do you think **which room** they stay? (L1 Korean in Author, 2012, p.181)  
 d. **How** do you think **who** is going to eat the cake?  
 (L1 Basque/Spanish in Gutiérrez, 2005, p.154)

It can be mysterious why *how* is spelled-out as the wh-expletive for some participants, not the usual *what*. However, if we assume that the minimal wh-feature [WH] directly merges into VP and receives the phonetic values of *what* or *how*, the either wh-expletive can be spelled-out depending on syntactic idiosyncrasy. Hence, we can continue to presume no direct syntactic relationship between the wh-expletive in matrix Spec-CP and the contentful wh-phrase in embedded Spec-CP. It might be also true that the processing mechanism initially guides LD wh-movement to be spelled-out one clause at a time, as if every CP is terminal. Furthermore, the data expose us to the originally-merged position of the wh-expletive; that is, matrix VP. In fact, there have been some rare productions alluding to the fact that this speculation is true. See (32).

- (32) a. Do you think **what which color** he likes? (L1 Korean in Author, 2012, p.186)  
 b. **What** you think **what where restaurant** do I ... (L1 Mongolian, P53)  
 c. **What** are you thinking about **what which dog** is ... (L1 Mongolian, P76)

The silent-scope marking in (32a) reveals the very moment that the wh-expletive has just appeared in matrix VP. In (32b) and (32c), the wh-expletive *what* appears in two syntactic positions: matrix Spec-CP and post-verbal position. It seems that the wh-expletive in the base position has not undergone the deletion operation at the moment of the spell-out. Then, wh-scope marking must have the following underlying structure in (33).

- (33) [<sub>CP</sub> Q ... think [WH] [<sub>CP</sub> who Julianne loves]]?

This data-driven speculation is in essence on par with the theoretical concept called ‘NP-shells’ (Stepanov, 2000; Stepanov and Stateva, 2006). Just like an NP c-commands a CP in a relative-clause structure, the wh-expletive like ‘a clausal correlative’ takes the entire finite CP as a complement, not just the contentful wh-phrase in embedded clause. Hence, the semantic denotation between LD wh-movement and wh-scope marking must be different. For LD wh-movement in *Who do you think Julianne loves?*, for example, the contentful wh-phrase *who*, is quantifying over a set of DP variables (e.g. smart boy, tall boy, rich boy, etc.) in the form

of *I think x*, where the value of *x* is limited to the DP *only* (e.g. the smart boy). For wh-scope marking as in *What do you think who Julianne loves?*, for example, the wh-expletive *what* denotes a set of possible propositions (that is, sentences in CP structure) in the form of *I think x*, where the value of *x* is limited to the *entire* proposition (the whole CP), not just the DP (Stepanov and Stateva, 2006).

As mentioned in Section I, although LD wh-movement is only the grammatical option in English, many languages allow both options, LD wh-movement and wh-scope marking, and some do only wh-scope marking. What is astonishing is that, by virtue of economy conditions, the Mongolian participants as well as other Altaic-language speakers derive wh-scope marking as dispensing with the more complex operation of inter-clausal Internal Merge for LD wh-movement. It happens to be in English that wh-scope marking is ungrammatical, but this structure is syntactically legitimate, semantically admissible, and cross-linguistically attested. What is also astonishing is that at the onset of LD wh-movement, Internal Merge displaces less (or lighter) elements containing the wh-phrase into matrix Spec-CP as starting to penetrate the clause boundary. The data reported here support the view that language acquisition is guided under economy conditions.

## VI Conclusion

Scope-marking strategies are certainly constrained by economy conditions, guiding the processing mechanism to be syntactically economical in the course of acquiring LD wh-movement in L2 English by adult Mongolian learners. Unless the learners have developed nativelike proficiency in English, LD wh-movement rarely emerges as it requires the costly operation of Internal Merge to penetrate the clause boundary from embedded Spec-CP to matrix Spec-CP. Hence, the Mongolian-English interlanguage dispenses with this option and contrives alternative strategies: silent-scope marking and wh-scope marking. Similarities between these two strategies are that every CP in their structure is terminal, the contentful wh-phrases are spelled-out in embedded Spec-CP, and the abstract wh-feature [WH] is externally merged into matrix clause. There is, however, one difference that makes silent-scope marking less complex (or simpler) than wh-scope marking, which conducts developing learners to exploit silent-scope marking prior to wh-scope marking. Theoretically, silent-scope marking marks the scope with [WH], resulting in neither a polar question nor a wh-question. Apparently, wh-scope marking marks the scope with the wh-expletive *what* or *how*—the phonological realization of [WH], resulting in an admissible sort of LD wh-question. Therefore, the former is a syntactic characteristic of developing learners whose lexicon is devoid of the wh-expletive; the latter can be a hallmark of advanced learners who absolutely employ the wh-expletive to mark the scope with an overt wh-phrase. Previous studies on LD wh-movement also report the emergence of such structures and consider them as mere errors. They are surely errors in adult English, but consistent appearances in L1 and L2 English and such a predominant emergence on those structures, especially, in Mongolian-English interlanguage reveal a developmental continuum that these sorts of scope-marking strategies are bound to surface in predetermined stages in language acquisition, so long as the learner's interlanguage is not frozen. The most economical silent-scope marking predates wh-scope marking which, in turn, predates LD wh-movement. Furthermore, economy conditions also guide the processing mechanism to displace the elements to be as minimal (or lighter) as possible when pied-piping the Q-morpheme as penetrating the clause boundary. Initially, developing learners do not displace even sub-elements of the wh-phrase to matrix Spec-CP; therefore, the entire wh-phrase ends up being spelled-out in embedded Spec-CP. However,

when advanced learners begin to displace the wh-phrase to matrix Spec-CP, they surrender definiteness and complexities of the wh-phrase. As a result, indefinite wh-phrases appear in matrix Spec-CP, although they have been definite in embedded Spec-CP. Also, simple wh-phrases appear in matrix Spec-CP, although they have been complex in embedded Spec-CP. To summarize, economy conditions restrict the processing mechanism from the onset of language acquisition; hence, more economical derivations inexorably emerge prior to less economical derivations. These conditions also exert on the derivation of LD wh-movement in English, and the learners are ineluctably bound to produce some economical derivations despite the grammaticality.

### Declaration of conflicting interest

The author declares that there is no conflict of interest.

### Notes

1. In this article, developing learners are assumed to possess limited competence in the language being acquired so that linguistic outputs display consistent errors and non-nativelike expressions.
2. These L2 data as well as L1 data have been orally elicited. Other than these studies, Okawara (2000) and Wakabayashi and Okawara (2003) present data of LD wh-questions in L2 English as produced by adult L1 Japanese, but they did not observe any wh-copying structures as those in (3). Schulz (2011) reports the emergence of wh-scope marking in English by adult L1 German and adult L1 Japanese speakers, but does not provide any actual data.
3. Slavkov (2015) would refer this sort of alternative as avoidance strategy signifying limited use of the intended structure. He views *avoidance strategy* to be a byproduct of “natural or spontaneous productions rather than premeditated responses” (p.205), but in this paper the term *avoidance* will be avoided although the concept can be on par.
4. Liceras et al. (2011, p.145) provide grammatical judgment data that adult French and English speakers find the example of wh-scope marking in L2 Spanish to be an acceptable structure as shown below.

- a. ¿Qué piensa Bea **quién** está demasiado ocupada?  
What think Beth **who** is too busy
- b. ¿Qué piensa Juan **dónde** debería estudiar Arturo?  
What think John **where** should study Arthur?

5. Similarly, Jakubowicz (2011) proposes a hypothesis that language development is susceptible to the computational complexities substantiated in the structure being acquired. Specifically, she validates her theory with the data of French wh-questions acquired from linguistically-impaired and even normally developing children who abide by the economy conditions of UG. This idea, the Derivational Complexity Hypothesis, assumes in general that “... less complex derivations are input convergent (i.e., correctly spelled-out and “pronounced” at the interfaces) before more complex ones” (Jakubowicz and Strik, 2008, p.106), possibly attributed to the limited capacity of working memory. Jakubowicz (2005) proposes a metric for measuring the complexity drawn in a given derivation, as below.

#### Derivational Complexity Metric (DCM) (Jakubowicz, 2005)

- a. Merging  $\alpha_i$   $n$  times gives rise to a less complex derivation than merging  $\alpha_i$  ( $n + 1$ ) times.
- b. Internal Merge of  $\alpha$  gives rise to a less complex derivation than Internal Merge of  $\alpha + \beta$ .

The DCM in (2) then alleges that economy conditions zero in on the less number of occurrences of Internal Merge as well as the less number of elements being displaced during Internal Merge. The DCM is without a doubt a practical yardstick to measure syntactic complexities pertained within a given derivation. This present article, however, proposes that the scale of division  $n$ -times in Internal Merge should be syntactically specified to ‘lexical elements pied-piping Q from embedded Spec-CP to matrix Spec-CP’ and the syntactic nature of  $\alpha$  and  $\beta$  in Internal Merge

should be ‘the numbers (or morphosyntactic weights) of lexical elements being pied-piped (or displaced). Another metric that this article employs in significant extent can be this: Deletion of  $\alpha$  gives rise to a less complex derivation than, so to say, Deletion of  $\alpha + \beta$ .

6. According to Merger Condition (Radford, 2009), clausal-internal arguments that receive the semantic role of patient, experiencer, theme, etc. is merged first with verb, followed by other types of internal arguments and then (pro)nominal internal arguments. In this article, however, the sequence of External Merge of different arguments into the VP is impertinent.
7. This article assumes that it is actually the DP with QP, not QP per se, that receives the syntactic and semantic roles. Q as a pure syntactic morpheme simply marks the structure as a question in the sentence-initial position (Cable, 2010).
8. Internal Merge displaces an element and “creates copies” (Chomsky, 2008, p.141) of it in every position it once was. For that, refer to the volume *The Copy Theory of Movement* (Corver and Nunes, 2007) to delve further into the movement creating a series of chains headed by a *head* and *copies* and the phonological component spelling-out the chain. See also Rizzi (2006).
9. Discussion on syntactic operations pertinent to  $vP$  does not critically relate to the goal of this article, and is thus largely overlooked.
10. Biolinguistic motives to delimit the Agree range within immediately-lower Spec-CP can be that a natural property of efficient computation “reduces computational load: what has once been constructed can be “forgotten” in later computations, in that it will no longer be changed” (Chomsky, 2005, p.11) and avails itself only of some features of lexical items in embedded Spec-CP as goals.
11. In essence, the head C also plays another role of probe to satisfy [EPP] property involving unvalued  $\phi$ -features (i.e., person, number, gender, etc.), but C coordinates with the head T(ense) of tense phrase (TP) immediately situated below CP (Pesetsky and Torrego, 2001). T inherits this role of probe from C, and turns itself as an active probe on behalf of C. T then also searches its c-command domain (that is, embedded Spec-CP) for lexical items that can share a matching feature. This operation is the same for the T of matrix TP and another T of embedded TP, but the discussion on T is beyond the scope of this article since LD wh-movement generally concern the wh-phrase piped-piping Q from embedded Spec-CP to matrix Spec-CP.
12. On top of what has been mentioned in endnote 1, developing learners are, syntactically, assumed to be deficient in syntactic knowledge of the wh-phrase pied-piping Q to the sentence-initial position and of the deletion of wh-copies in intermediate Spec-CPs. They also possess the non-adult-like L1 or non-native-like L2 processing mechanism of the language being acquired. Immaturity of their processing mechanism cannot perform consistent Agree between probe and goal.
13. English as well as many languages generally requires the leftmost copy to maintain the phonological features and all other copies to discard their phonological features. Yet, there are some other languages and dialects that allow an intermediate copy to spell-out. Refer to Bošković and Nunes (2007) and Stjepanović (2007).
14. a. **Waaroor** dink julle **waaroor** stry ons die meeste? (Afrikaans; Du Plessis, 1977, p.725)  
**Whereabout** think you **whereabout** argue we the most  
b. **Wêr** tinke jo **wêr**’t Jan wennet? (Frisian; Hiemstra, 1986, p.99)  
**where** think you **where** that-CL John lives  
c. **Kas** o Demiri mislinola **kasi** Afifa dikhla? (Romani; McDaniel, 1989, p.712)  
**whom** does Demir think **whom** Arifa saw?  
d. **Wovon** glaubst du **wovon** sie träumt? (German; Felser, 2004, p.556)  
**of.what** believe you **of.what** she dreams  
e. **Wie** denk je **wie** het verhaal aanJan heft verteld? (Dutch; Schippers, 2009, p.6)  
**who** think you **who** the story to Jan has told
15. The nature of wh-expletives in wh-scope marking has been a moot topic in syntax. Van Riemsdijk (1983) first proposed wh-scope marking as a structure alternative to LD-movement in

which “the wh-feature percolates” (p.12) from the overt wh-phrase in embedded Spec-CP to matrix Spec-CP. This approach assumes a direct dependency between the wh-expletive and the wh-phrase in embedded Spec-CP. On the other hands, Dayal (1994) argues against it and proposes that there is an indirect dependency between the wh-expletive and the wh-phrase in embedded Spec-CP. She claims an argument that the wh-expletive externally merges into matrix clause and quantifies over the entire embedded clause. Refer the volume *Wh-Scope Marking* edited by Lutz et al. (2000) which compiles a number of articles mainly on either of the approaches. The debate has still carried on until recently. While Barbiers et al. (2010) support the direct dependency approach with Dutch data, Haida (2007), den Dikken (2009), and Legate (2011), among others argue for the indirect dependency approach. This article is on par with the indirect dependency approach, but syntactic reasoning for it is beyond the scope of the paper.

16. a. **Wat** tinke jo **wêr't** Jan wennet? (Frisian; Hiemstra, 1986, p.99)  
**What** think you **where** that-CL John lives  
b. **So** o Demiri mislinol **kas** i Arifa dikhla? (Romani; McDaniel, 1989, p.569)  
**What** does Demir think **whom** Arifa saw?  
c. Jaun **kyaa** soctaa hai meri **kahaaN** jaayegii? (Hindi; Dayal, 1994, p.140)  
John **what** thinks Mary **where** will-go  
d. **Mit** gondolsz, hogy **kit** látott János? (Hungarian; Horvath, 1997, p.510)  
**what-ACC** think-2sg that **who-acc** saw-3sg John-nom  
e. **Jak** myślisz, **kto** dostanie nagrodę? (Polish; Lubańska, 2004, p.81)  
**how** think **who-Nom** will-get award-Acc.  
f. **Was** glaubstdu, **welchen** **Mann** sie liebt? (German; Felser, 2004, p.552)  
**what** believeyou **which** **man** she loves  
g. **Keqsey** Mali itom **wen** nil kisi-niskam-uk? (Passamaquoddy; Bruening, 2006, p.28)  
**what** Mary say.3 **who** 1 PERF-dance.with.ANO-1CONJ  
h. **Kak** vy dumaete, **kogo** ljubit Ivan? (Russian; Stepanov and Stateva, 2006, p.2125)  
**how** you think **whom** loves John  
i. **Wat** denk je **wie** ik gezien heb? (Dutch; Barbiers et al., 2010, p.2)  
**what** think you **who** I seen have  
j. **Nyarrpa**-ngku yimi-ngarru-rnu Jakamarra-rlu kuja-ka  
**how-2sg.obj** speech-tell-past Jakamarra-ERG DECL.C-pres.impf  
**nyarrpara**-kurra ya-ni Jampijinpa? (Warlpiri; Legate, 2011, p.97)  
**where**-all leave-past Jampijinpa
17. Den Dikken (2009) argues that Spec-CP is not a stopover. According to his analysis, the wh-phrase in LD wh-movement targets matrix Spec-vP before landing in matrix Spec-CP, as in (a); see also Felser (2004). On the other hand, Craenenbroeck (2010) proposes that while the simple wh-phrase makes a stopover in embedded Spec-CP, the complex wh-phrase in LD wh-movement as in (a) below directly moves to matrix Spec-CP from the originally-merged position in embedded clause as in (b), without any stopovers. Yet, his claim cannot explain the data of silent-scope marking with the complex wh-phrase in (6) and (27).  
a. [<sub>CP</sub> **Which people** do [<sub>TP</sub> you [<sub>VP</sub> ~~which people~~ think [<sub>CP</sub> William killed ~~which people~~]]]]? (P46)  
b. [<sub>CP</sub> **Which people** do you think [<sub>CP</sub> William killed ~~which people~~]]? (P46)

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