Empirical observations. It has been observed that in Korean, the numeral and classifier combination can be adjacent to and follow its associated nominal as in (1a) and it can also be separated from its associate noun by a case marker as in (1b)(Shin 2017 for Korean & Watanabe 2006 for Japanese).

(1)a. Cheli-ka   **[wain twu byeng]**-ul   kkayttuly-ess-ta.
    Cheli-NOM   [wine two CL]-ACC   break-PST-DEC
    'Cheli broke two bottles of wine.'

  b. Cheli-ka   **[wain-ul   twu byeng]**   kkayttuly-ess-ta.
    Cheli-NOM   [wine-ACC   two CL]   break-PST-DEC
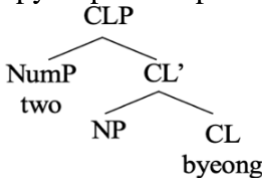   'Cheli broke two bottles of wine.'   Shin (2017)

As in (2a) and (3a), the entire noun phrase in (1a) and (1b) can scramble to the sentence initial position. On the face of it, it seems that all the material in the noun phrase has to be scrambled as (2b), (2c) and (3b) suggest. However, the acceptability of (3c) then seems puzzling, since only the head noun with case marker is scrambled.

(2)a. **[wain twu byeng]**-ul   Cheli-ka   t kkayttuly-ess-ta.
    [wine two CL]-ACC   Cheli-NOM   break-PST-DEC
    'Cheli broke two bottles of wine.'

  b. ***wain**   Cheli-ka   t [**twu byeng**]-ul   kkayttuly-ess-ta.
    wine   Cheli-NOM   [two CL]-ACC   break-PST-DEC

  c. *[**twu byeng**]-ul   Cheli-ka   **wain** t kkayttuly-ess-ta.
    [two CL]-ACC   Cheli-NOM wine   break-PST-DEC

(3)a. [?]**wain-ul   [twu byeng]**   Cheli-ka   t kkayttuly-ess-ta.
    wine-ACC   [two CL]   Cheli-NOM   break-PST-DEC
    'Cheli broke two bottles of wine.'

  b. ***[twu byeng]** Cheli-ka   **wain-ul** t kkayttuly-ess-ta.
    [two CL]   Cheli-NOM   wine-ACC   break-PST-DEC

  c. **wain-ul**   Cheli-ka   t **[twu byeng]**   kkayttuly-ess-ta.
    wine-ACC   Cheli-NOM   [two CL]   break-PST-DEC
    'Cheli broke two bottles of wine.'

This study aims to reveal the structures of cases like (1) which involve a numeral, a classifier, and a head noun. I show that in Korean, there is a restriction on which material within the numeral classifier noun phrase can be moved. I present a novel argument that this restriction on scrambling follows from a theory of cyclic linearization (Fox & Pesetsky 2005 and Ko 2007). I argue that DPs are phases and hence the linear order established within DP must be preserved in higher phasal domains. In this way, these differences in the well-formedness of numeral classifier scrambling constructions in Korean provide further evidence for the theory of cyclic linearization.

The structure of the noun phrase. To account for this puzzle, following Watanabe (2006), I first posit that in Korean, there is a functional projection CLP, whose head is a classifier, located within the extended projection of the noun. Here, the numeral quantifier occupies Spec, CLP as in (4). The phrasal status of modified numerals, as demonstrated in (5), suggests that numerals have to occupy a specifier position rather than a head position


(4)

(5) Cheli-ka   [wain-ul   ceokeoto/manhaya   sey   byeong]/[wain
    Cheli-NOM wine-ACC at least/at most   three CL   /wine
    ceokeoto/manhaya   sey byeong-ul]   kkayttuly-ess-ta.
    at least/at most   3   CL-ACC   break-PST-DEC
    'Cheli broke at least/at most three bottles of wine.'

I assume that the outermost layer of Korean nominals is KP, whose case value is determined from the outside (as in standard case theory). However, for reasons that will become clear below, it is not K^0 that hosts case affixes in Korean; rather, those affixes are hosted in the head of XP, a projection that moves to Spec, KP and checks its features against the (phonetically null) K^0 under spec-head agreement. Also, given that 'Num-N-CL' ordering is disallowed as in (6), I assume that NP moves to Spec, XP in (7a), triggered by EPP feature of X. Similar to an argument made by Watanabe (2006) for Japanese, I claim that (1a) and (1b) are transformationally related. The difference between the two is created by multiple applications of phrasal movements within DP: raising of XP to KP whose head has X feature results in (1a) as in (7b), and raising CLP to QP followed by the obligatory movement of XP to Spec, KP results in (1b) as in (7c). (1a) and (1b) thus both derive from the same base structure in (7a).

(6) *Cheli-ka   **[twu wain byeng]**-ul   kkayttuly-ess-ta.
     Cheli-NOM [two   wine CL]-ACC   break-PST-DEC
     'Cheli broke two bottles of wine.'
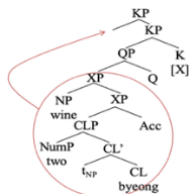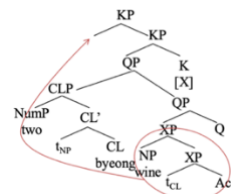

(7) a.   b.   (= 1a)   c.   (= 1b)

Analysis. I claim that only the full-extended projection of a noun phrase can be scrambled to the sentence initial position. Thus, (3c) is derived via scrambling a remnant KP formed by the movement of CLP out of KP, where CLP is left-adjoined to VP as in (8).

(8) [$_{CP/TP}$ [$_{DP}$ N-ACC   t$_1$]$_2$ [$_{TP}$ [$_{VP}$ [$_{CLP}$ NUM+CL]$_1$ [$_{VP}$ t$_2$]]]

Adopting Fox & Pesetsky's Cyclic Linearization proposal, I propose that DPs are phases in Korean, and ordering statements generated within DP must be preserved by later operations. Thus, once the ordering among a numeral, classifier, case and a head noun within DP is established as 'noun<Acc<Num<Cl' as in (9), or as 'noun<Num<Cl<Acc' as in (10), this ordering must be preserved in subsequent phases. Thus, the current account successfully rules in (3c) and rules out (3b), as respectively shown in (9) and (10).

(9)   [$_{NounPhrase}$ noun < Acc < Num< CL]   ≠   [$_{CP}$ Num< CL < noun <Acc]   (= 3b)
(10) [$_{NounPhrase}$ noun < Num< CL < Acc]   =   [$_{CP}$ noun < Num< CL < Acc]   (= 3c)

Prediction. The current analysis correctly predicts that moving CLP out of DP without further remnant movement of DP is impossible because this movement does not preserve the linearization generated within DP:

(11) ***Cheli-ka**   **[twu byeng]**   **[wain-ul**   t]   kkayttuly-ess-ta.
         Cheli-NOM [two CL]   wine-ACC   break-PST-DEC
         'Cheli broke two bottles of wine.'

Another prediction that this analysis makes is that if additional phrases such as *amwukesto* follows a numeral and classifier within a noun phrase, as in (12a), moving the remnant KP after extracting CLP out of KP would yield ill-formedness. That is because such a derivation would cause a conflict in linearization statements: the ordering in (12a), 'N<Acc Num<CL<NPI' differs from the ordering in (12b),'N<Acc <NPI < Num<CL'.

(12) a. $^?$Cheli-ka   **[chaek-ul**   **twu kwon**   **amwukesto]** saci-anh-ass-ta.
            Cheli-NOM [wine]-ACC   two CL   anything(NPI)   buy-PST-DEC
             '(lit) Cheli did not break either of the two bottles of wine.'
       b. [*[**chaek -ul** t$_1$ **amwu-kes-to]** [$_{TP}$ Cheli-ka [$_{VP}$ **[twu kwon]$_1$**[$_{VP}$ t$_2$ saci-anh]-ass]-ta.