Person and Number Hierarchy In Turkish: A Processing-Based Approach*

Mehmet AYGÜNEŞ**

Abstract

In the literature, studies have suggested a hierarchical structure in the form of 1st P(erson)> 2nd P(erson), 2nd P > 1st P, 1st P = 2nd P for the person features in the language descriptions by taking the level of speech participation of person features into account. This study aimed to determine whether there is a person hierarchy in the form of 1st P > 2nd P or 2nd P > 1st P and a number hierarchy in the form of plural> singular or singular> plural in the processing of person and number features in Turkish subject DPs and IP heads. For this purpose, the Event-Related Potentials (ERP) were collected. The results show hierarchical structuring in the form of 2nd P > 1st P in terms of person features in the subject DP while structuring in the form of 1st P = 2nd P in the IP head. In terms of the number feature, no hierarchical structuring between singularity and plurality was found in either the subject DP or the IP head. The reason why this effect on person features in the IP head contrasts with the subject DP is considered to result from both the interpretability of the features in the subject DP and being equipped with D-features. The reason for the hierarchy in the subject DP to be 2nd P > 1st P is thought to stem from the fact that in the presentation of the first and second person in speech participant phrase, the [receiver] feature is presented in the second person, while the [speaker] is not presented in the first person, and the second person is more pronounced than the first person. It is thought that the reason why there is no difference in the number features is that the Number feature is uninterpretable in the IP head, as well as being a weak feature in the subject DP.

Keywords: Person, Number, Processing, Event Related Brain Potentials, N400, P600.

** Assist. Prof. Dr., Istanbul University, Faculty of Letters, Department of Linguistics, Istanbul, Turkey.
Elmek: mehmet.aygunes@istanbul.edu.tr
https://orcid.org/0000-0002-0327-6905.

Türkçede Kişi ve Sayı Hiyerarşisi: İşlemleme Temelli Bir Yaklaşım

Öz

Alanyazında kişi özelliklerinin konuşma eylemine katılım düzeyini dikkate alarak dillerde yapılan betimlemelerde kişi özellikleri için 1.kişi > 2.kişi, 2.kişi > 1.kişi, 1.kişi = 2.Kişi biçiminde çeşitli hiyerarşik yapılanmaların önerildiği görülmektedir. Bu çalışmanın amacı; Türkçede Belirleyici Öbeğinde (BelÖ) ve Çekim Öbeğinin (ÇÖ) başında kişi ve sayı özelliklerinin işlemlenmesinde 1. kişi > 2.kişi ya da 2.kişi > 1.kişi biçiminde kişi hiyerarşisi ve Çoğul > Tekil ya da Tekil > Çoğul biçiminde bir sayı hiyerarşisi bulunup bulunmadığını Olaya İlişkin Beyin Potansiyelleri yöntemi ile belirlemektir. Çalışma sonucunda BelÖ'de kişi özellikleri açısından 2.kişi > 1.kişi biçiminde bir hiyerarşik yapılanma görülürken, ÇÖ başında 1.kişi = 2.kişi biçiminde bir yapılanma olduğu görülmüştür. Sayı özelliği açısından gerek BelÖ'de gerekse ÇÖ başında sayı kategorisinde tekillik ile çoğulluk arasında hiyerarşik bir yapılanmanın olmadığı görülmüştür. Kişi özelliklerinde ilgili etkinin ÇÖ'nün aksine BelÖ'de görülmesinin nedeni BelÖ'deki özelliklerin gerek yorumlanabilir olmasından, gerekse B-özelliklerle donatılı olmasından kaynaklandığı düşünülmektedir. BelÖ'deki hiyerarşinin 2. kişi > 1.kişi biçiminde olmasının nedeni olarak da katılımcı öbeği içerisinde yer alan birinci ve ikinci kişinin sunumunda, [alıcı] özelliğinin ikinci kişide sunulurken [konuşucu]'nun birinci kişide sunulmaması dolayısıyla ikinci kişinin birinci kişiye göre daha belirgin olmasından kaynaklandığı düşünülmektedir. Sayı özellikleri içerisinde fark oluşmamasının nedeninin Sayı özelliğinin ÇÖ başında yorumlanamaz olmasının yanı sıra BelÖ'de de zayıf bir özellik olmaları olduğu düşünülmektedir.

Anahtar Kelimeler: Kişi, Sayı, İşlemleme, Olaya İlişkin Beyin Potansiyelleri, N400, P600.

Genişletilmiş Özet

Alanyazında Kişi ile Sayı özellikleri arasındaki ilişkinin yanı sıra Kişi kategorisi içerisindeki ilişkilerin de incelendiği ve bu özellikler içerisinde de hiyerarşik yapılanmanın bulunabileceği öne sürülmektedir (Benveniste, 1966; Silverstein, 1985; Carminati, 2005). Kişi özelliği diğer bir ifadeyle, [katılımcı] özelliği içerisindeki yapılanma için 2. kişi > 1. kişi (Harley ve Ritter, 2002), 1.kişi > 2.kişi (Mc Ginnis, 2005) biçiminde farklı hiyerarşik yapılanmaların sunulduğu ve [katılımcı] özelliği açısından diller arasında farklılıkların oluşabildiği görülmektedir.

Bu çalışmanın temel amacı; Türkçede gerek özne Belirleyici Öbeği (BelÖ) içerisinde gerekse Çekim Öbeğinin (ÇÖ) başında birinci kişi ve ikinci kişi özelliklerinin bilişsel işlemlenmesinde bir farklılaşmanın olup olmadığını belirlemektir. Diğer bir ifadeyle, bu çalışmada özne konumunda yer alan birinci kişi ve ikinci kişi özellikleri arasında ve eylem çekiminde yer alan birinci kişi ve ikinci kişi özellikleri arasında 1. kişi > 2. kişi ya da 2. kişi > 1. kişi biçiminde işlemleme tabanlı bir farklılaşmanın oluşup oluşmadığı sorgulanmaktadır. İkinci olarak, Türkçede gerek özne BelÖ'de gerekse ÇÖ başında yer alan sayı özellikleri arasında bir işlemleme farklılığının bulunup bulunmadığı da bu çalışmanın temel soruları arasında yer almaktadır. Bu çerçevede öznede ve eylem çekiminde yer alan Tekil ve Çoğul özelliklere bakıldığında Tekil > Çoğul ya da Çoğul > Tekil biçiminde bir işlemleme farklılığının oluşup oluşmadığı da sorgulanmaktadır.

İlgili özelliklerin bilişsel işlemlenmesi incelendiğinden çalışmada Olaya İlişkin Beyin Potansiyelleri (OİP) yöntemi kullanılmıştır. Bu yöntemde katılımcıların kafa yüzeyine yerleştirilen elektrotlar aracılığı ile sunulan uyaranlara karşı beynin ürettiği elektriksel aktivasyon yüksek çözünürlüklü biçimde kaydedilebilmektedir. OİP çalışmalarında uyaran sunumundan 400 ms sonra negatif polaritede tepe yapan N400 bileşeni, uyaran sunumundan 600 ms sonra pozitif polaritede tepe yapan P600 bileşeni gibi bileşenlerin dilsel işlemlemeyle ilintili olduğu belirtilmektedir. Sözgelimi N400 bileşeninin anlambilimsel

işlemlemeyle (Kutas ve Hillyard, 1980a, 1980b) ilintili olduğu belirtilmekle birlikte, bu bileşenin sözdizimsel süreçlere de duyarlı olabileceği de (Mancini ve diğ., 2011a, 2011b) öne sürülmektedir. P600 bileşeninin ise sözdizimsel (Kaan ve Swaab, 2003) ve biçimsözdizimsel süreçlere (Carreiras ve diğ., 2004; Kaan ve diğ., 2000) duyarlı olduğu belirtilmektedir.

Bu çalışmada gerek birinci kişi gerekse ikinci kişi özelliklerinin işlemlenmesinde N400 ve P600 bileşenlerinin oluştuğu görülmüştür. Her ne kadar iki kişi özelliğinde de benzer OİP bileşenleri gözlemlense de N400 bileşeni açısından özne BelÖ'sünde 2. kişi'nin 1. kişi'den daha büyük genlikli N400 ürettiği, diğer bir ifadeyle özne BelÖ'sünde 2. kişi'nin işlemlenmesinde daha fazla bilişsel kaynağa gereksinim duyulduğu gözlemlenmiştir. Buna karşın, eylem çekiminde diğer bir ifadeyle ÇÖ başında gerek N400 bileşeni gerekse P600 bileşeni açısından 1. kişi ile 2. kişi arasında anlamlı bir farklılığın oluşmadığı görülmüştür. Kişi özelliği açısından değerlendirdiğinde, özne BelÖ'sünde 2. kişi > 1. kişi biçiminde bir kişi hiyerarşisinin bulunduğu ancak ÇÖ başında yer alan kişi özellikleri arasında böyle bir ayrışmanın bulunmadığı gözlemlenmiştir. Bu bulguların oluşmasında özne BelÖ'sünde özelliklerin gerek yorumlanabilir özellikler olması gerekse özne BelÖ'sünün B-özellikler ile donatılı olmasının etkili olması olasıdır. ÇÖ başında yer alan kişi özelliklerinin gerek yorumlanabilir olmamasının gerekse B-özelliklerle donatılı olmamasının eylem çekiminde 2. kişi > 1. kişi biçimindeki bir hiyerarşinin oluşmasını engelleyebileceği de düşünülebilir.

Çalışmanın ikinci temel sorusu olan Sayı hiyerarşisine bakıldığında ise, gerek BelÖ'de gerekse ÇÖ başında tekillik ile çoğulluk arasında bir farklılaşmanın olmadığı görülmüştür. Alanyazında Sayı özelliğinin seçimlik olduğunu (Chomsky, 1995) ya da zayıf bir özellik olduğunu belirten (Nevins, 2011) çalışmalar bulunmaktadır. Sayı özelliğinin bilişsel belirginliğinin gerek BelÖ'de gerekse eylem çekimde zayıf olmasının tekillik ile çoğulluk arasında bir farklılaşmanın oluşmasını engellediği düşünülmektedir.

Son olarak Kişi ve Sayı özelliklerinin etkileşimine bakıldığında, özne BelÖ'sü içerisinde 2.kişi-tekil biçimin, 1.kişi-tekil biçimden daha büyük negativite oluşturduğu (2.kişi tekil > 1.kişi tekil) diğer bir ifadeyle, 2.kişi- tekil biçimin işlemlenmesinde daha fazla bilişsel kaynağa ihtiyaç duyulduğu görül-

mektedir. ÇÖ başında yer alan Kişi ve Sayı özelliklerine bakıldığında ise, özne BelÖ'sünün tam tersi bir görünümle, 1. kişi-tekil biçimin, 2. kişi-tekil biçiminden daha büyük negativite oluşturduğu görülmektedir (1. kişi tekil > 2. kişi tekil). Çoğul yapılarda ise, özne BelÖ'sünde 1. kişi-çoğul biçimin 2. kişi-çoğul biçimle benzer bir etki oluştururken (1. kişi-çoğul = 2. kişi-çoğul) ÇÖ başında 2. kişi-çoğul biçimin, 1. kişi-çoğul biçimden daha büyük negativite oluşturduğu (2. kişi çoğul > 1. kişi çoğul) görülmüştür. Kişi ve Sayı özelliğinin etkileşiminde ortaya çıkan bu görünümlerin temelinde de yine özne BelÖ'sünün taşıdığı özelliklerin belirginliğinin temel rol oynadığı düşünülmektedir. Örneğin tekil yapılarda özne BelÖ'sünde ikinci kişi ile birinci kişi karşılaştırıldığında 2. kişinin (Sen) +Katılımcı, +Alıcı özellik taşıdığı, buna karşın 1. kişinin (Ben) sadece +Katılımcı özellik taşıdığı dolayısıyla 2. kişi > 1. kişi hiyerarşisinin altında yatan nedenin bu kişilerin taşıdığı özellikler olduğu dikkat çekmektedir. Benzer biçimde, çoğul yapılarda 1. kişi (Biz) +Katılımcı, +(Alıcı) özellik taşırken 2. kişi (Siz) benzer biçimde +Katılımcı, +Alıcı özellik taşımakta bu durum da iki kişi özelliği arasında işlemleme farklılığın oluşmamasına neden olmaktadır. Dolayısıyla, gerek özne BelÖ'sünde gerekse ÇÖ başında yer alan Kişi ve Sayı özelliklerinde özellik sayısı arttıkça işlemleme sürecinde bir yük oluşturduğu ve bunun daha N400 bileşeninin genliğine etki ettiği görülmektedir.

1. Introduction

In addition to the literature which suggests that there is a markedness hierarchy between the person and number features in the form person>number (Nevins et al. 2007; Mancini et al. 2011; Aygüneş 2013/Aygüneş et. al. 2021; Mancini et al. 2014; Zawiszewski et al. 2016), observations in various languages indicate that there may be a hierarchical structuring within the person feature (Benveniste 1966; Silverstein 1985; Carminati 2005 et al.). Benveniste (1966) argues that while the first and the second person have grammatical features of person, the third person does not refer to a specific, particular person; therefore, the third person does not have the person feature. In other words, Benveniste (1966) proposes that while the first and second person are grammatical features, the third person refers to a discursive feature.

Silverstein (1985), as a result of interlingual observations, states that person and number features have some sub-hierarchies, and there is a hierarchy in the form of singular>plural in number features, 1stP(erson) /2ndP(erson) >3rdP(erson) in the person features. Similarly, Carminati (2005) suggests a sub-hierarchy of 1stP/2ndP>3rdP in Italian. Furthermore, Carminati (2005) argues that such a hierarchy also includes the person> number hierarchy because the first and second persons are equipped with the person features, and the third person is equipped with the number features.

Crosslinguistic observations support the argument that there may be a hierarchy between the first person and the second person in verb agreement. Harley and Ritter (2002) claim that according to the person feature in the Morphosyntactic Feature Geometry, there can be three forms of differentiation within the person feature of languages. The first and second person that constitutes the Participant node is different from the third person that does not have the participant feature. In this case, the first and second persons exhibit a more distinctive feature than the third person. Harley and Ritter point out that if there is a specifically inclusive feature in a language, that feature will have the Participant node. Accordingly, it may have two dependent features, [speaker] and [addressee], as shown in Figure 1.
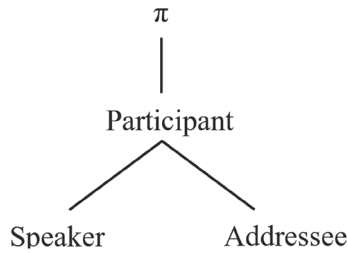
π
|
Participant
╱   ╲
Speaker   Addressee

Figure 1. Inclusive feature

Although an inclusive interpretation is possible in Turkish, there is no morpheme that represents the inclusive feature:

(1) Biz konuyu biliyoruz.
We know the subject.
(Biz/We: speaker and addressee)
(Biz/We: speaker and others than the addressee)

In Turkish, different morphological processes do not occur for both interpretations, so there is no morpheme to express the inclusive feature in Turkish. Harley and Ritter (2002) claim that in languages such as Turkish, in which the inclusive feature does not have a morpheme, there is a default feature in the speaker [participant] node. In other words, Harley and Ritter (2002), as a result of their observations on 91 languages, report that the [speaker] is the default feature in the participant node. As a result, the first person and second person presentations are shown below (Figure 2).
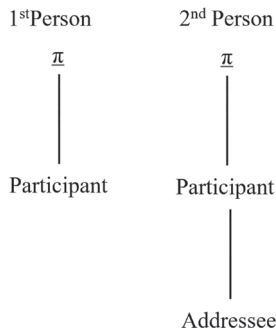
1stPerson   2nd Person
π   π
| |
Participant   Participant
|
Addressee

Figure 2. Participant features of the first and second person
(adapted from Harley and Ritter, 2002)

In other words, second person is more marked than first person because it has the [addressee] feature. Third person is the least marked, and in this case, there is a hierarchy in the form of $2^{nd}P > 1^{st}P > 3^{rd}P$ as follows (Figure 3):

Figure 3. Participant features of the first, second and third person
(adapted from Harley and Ritter, 2002)

Contrary to this view, McGinnis (2005) argues that the [speaker] is attached to the [participant] node before the [addressee], which means that the first person and the inclusive feature are more marked, while the second person is less marked. The third person is the least marked ($1^{st}P > 2^{nd}P > 3^{rd}P$) (Figure 4):

Figure 4. Participant features of the first, second and third person (McGinnis, 2005)

Considering the morpho-syntactic expression form in the information structure, Jelinek (2000) asserts that referential hierarchical structuring can be associated with two basic rules and argues that there is a hierarchy in the form of $1^{st}P > 2^{nd}P > 3^{rd}P$ (animate) > $3^{rd}P$ (inanimate) within the argument features. As a second rule, he

suggests that the person in the object position should not be in a higher position than the person in the subject position. Nichols (2001), in her studies on Kashmiri, argues that there is a hierarchical structuring in the person feature in the form of 1st P> 2ndP > 3rdP, and the second rule proposed by Jelinek is also valid for Kashmiri. In Picuris language, she indicates that the second rule is also valid, but the hierarchical structuring of person feature is reflected in this language as 1stP /2ndP > 3rd P. As a result of her observations in Kashmiri and Picuris languages, Nichols (2001) proposes that when person features are structurally related to tense, they have a hierarchical effect; moreover, the argument above the hierarchy is related to tense.

Bianchi (2006), as a result of her observations on Italian, states that the first and second person have different appearances from the third person in the Speech Participation Phrase (SPP), and the third person is lower in the argument structure.
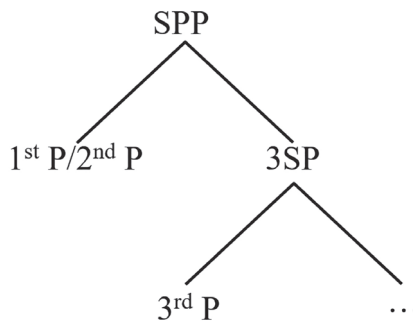
SPP

1st P/2nd P   3SP

3rd P   …

Figure 5. Speech participation phrase (SPP) structuring

However, Bianchi (2006) claims that despite the difference of the third person from the first and second persons, both possibilities of 1stP> 2ndP and 2nd P> 1stP between the first and second person are not possible for Italian.

Many studies on the acquisition of pronouns in the first language show that the first person is acquired earlier than the second person, and so the [speaker] is earlier than the [addressee] in the participant node (Chiat 1978; Feuer 1980; Clark 1985). This observation regarding the acquisition process supports that the second person is more marked while the first person is the default.

İnce, Aygen, and Aydın (2012) states that the IP (Inflectional phrase) head in Turkish prefers Subject DP with the [participant] feature, and it can agree with the

Subject DP with the [participant] feature in a lower position because there is no VP in copula structures and no phase edge between the IP head and the Subject DP with the [participant] feature. Regardless of whether the first person is a subject or a predicate (2), the first person morphemes are used in the inflection, and this is also valid for the second person in (3). On the other hand, in (4), the copula structure always agrees with the Subject DP in the subject position:

(2)   a. Ben   o-**yum**   b. O   ben-**im** $1^{st}P> 3^{rd}P$
          1st P   *3rd P-1^{st}P SUF.*   *3rd P*   *1st P-1^{st}P SUF.*
          I   *am her/his*   *(S)he*   *is me*

(3)   a. Sen   o-**sun**   b. O   sen-**sin** $2^{nd}P> 3^{rd}P$
          2nd P   *3rd P-2nd P SUF.*   *3rd P*   *2^{nd}P-2^{nd}P SUF.*
          You   *are her/his*   *(S)he*   *is you*

(4)   a. Ben   sen-im   b. Sen   ben-sin $2^{nd}P= 1^{st}P$
          1st P   *2^{nd}P-1^{st}P SUF.*   *2nd P*   *1st P-2nd P SUF.*
          I   *am you*   *You*   *are me*

As can be seen in 2, 3 and 4, in structures where vP is found in Turkish and thus forms a phase, the IP head agrees with the Subject DP, which is only in the subject position, and in the copula structures without the vP phase, it can also agree with the Subject DP in the predicate position. In such cases, although the hierarchy of $1^{st}P= 2^{nd}P> 3^{rd}P$ appears in the Turkish syntax, it is also possible to see a hierarchy between the first person and the second person in processing, as well as this hierarchy reflected in the syntax.

As a result, all possible explanations in the form of $2^{nd}P> 1^{st}P$, $1^{st}P> 2^{nd}P$ and $1^{st}P = 2^{nd}P$ are presented for the structuring within the [participant] feature in the literature, and there are differences among languages in terms of [participant] feature.

In the literature, there is less discussion about the number feature, unlike these different opinions about the structuring within the person features. Chomsky (1995) argues that the number feature is an optional feature among the grammatical features and he divides it into two, as intrinsic and optional; in other words, there is no need for a separate head for the number feature, and this relationship is formed by adding to the word in the numeration. Panagiotidis (2002) states that the number feature is not interpretable on the Subject DP. Similarly, Nevins (2011) proposes that the person feature [± participant] shows a binary feature such as [± speaker], while the number feature is weak and has only the [+ plural] feature. Therefore, it is emphasized in the literature that the number feature is weak.

2. Processing of Person and Number features

Person and Number features are among the topics discussed in processing studies as well as theoretical linguistics studies, and Event-Related Potentials (ERP) is mostly used in processing studies examining these features.

ERP is a method based on measuring the brain's electrical activity that occurs time locked to certain stimuli through electrodes on the scalp. Studies in the literature claim that ERP components such as N400 and P600 are related to language processing. The N400 component peaks in negative polarity 400 ms after stimulus presentation and is observed in the posterior area. The N400 component is argued to be related to processing semantic processes (Kutas and Hillyard 1980a, 1980b). However, it is also related to morphosyntactic and syntactic processes (Bornkessel, McElree, Schlesewsky & Friederici 2004; Choudhary et al. 2009; Mancini et.al. 2011a; 2011b; Zawiszewski et.al. 2016). The P600 component, on the other hand, peaks in positive polarity 600 ms after stimulus presentation and is distributed in the posterior area. It is suggested that the P600 component is sensitive to syntactic processes. Although there are no ERP studies that examine the structuring of the person feature and the number feature in the literature, there are ERP studies examining the relationship between Person and Number features. Nevins et al. (2007) argued that the condition of Gender mismatch together with Person mismatch in the experiment set they created with third person structures in Hindi, created a P600 amplitude greater than all other conditions. Although the study mentioned positivity in the condition of Gender mismatch with Number mismatch, it reported that the amplitude of P600 created by the Person + Gender mismatch condition was greater than this condition. Hence, the findings supported a hierarchy in the form of Person> Number. Silva-Pareyra and Carreiras (2007) used both singular and plural forms with first and second person structures in Spanish and found no difference between processing of Person and Number features. Mancini et al. (2011a) stated that Person and Number traits can only be examined through 3rd person structures. The study indicated that the processing of the Number feature is related to the LAN and the processing of the Person feature is related to the N400. Based on this finding, they claimed that the parser is differentially sensitive to the two features. Zawiszewski et al. (2016) examined the processing of Person and Number features through Basque and with second singular person structures. It indicated that the N400 + P600 pattern was observed in the processing of both Person and Number features, but the difference between Person and Number features occurred in the P600

component. Aygüneş (2013)/Aygüneş et. al. (2021), similar to Silva-Pareyra and Carreiras's (2007) experiment set, used both singular and plural forms of first and second person structures in Turkish, and N400 component was formed in the processing of both Person and Number properties, but N400 amplitude was greater in Person feature. As a result, he suggested that there was a difference in the processing of the two features.

Although there are studies on the processing of person and number features in the literature, there are no studies in the ERP literature that focuses on processing within the person feature (1st P, 2nd P, 3rd P) and number feature (singular, plural). This study aims to determine whether there is a person hierarchy in the form of 1stP> 2ndPor 2ndP> 1stPand a number hierarchy in the form of P(lural)> S(ingular) or S> P in the processing of person and number features in the Subject DP and the IP head in Turkish.

3. Method

In this study, the ERP data in Aygüneş (2013) / Aygüneş et.al. (2021) regarding the relationship between the person and number feature, have been reconstructed and analyzed to determine whether there is a differentiation in the person and the number feature. For this reason, although the participant, material, process, EEG recording, and analysis parameters in this study were the same as Aygüneş (2013) /Aygüneş et.al. (2021), this study includes the reconstruction of the data, its statistical analysis, and implications in a way to reveal and revise the structure within the person and number feature.

3.1. Participants: In the study, we analyzed the data of 34 participants (19 females, mean age: 27.02; 15 males, mean age: 26.18). All of the participants studying at least undergraduate level were right-handed and had a normal or corrected vision. The native language of all participants was Turkish. Before starting the experiments, the participants filled out and signed the "Informed Consent Form" approved by the Istanbul University Ethics Committee.

3.2 Material: This study questioned whether there is a hierarchical difference in the person (1st P, 2nd P) and number (S, P) features in the Subject DP and the processing within the person and number features in the IP head. Thus, we formed two sub-analysis sets, and analyzed them separately.

Wagers et al. (2009) emphasize that the best way to understand the processing procedure is when the system is forced to deal with errors; in other words, the processing of ungrammatical structures created in a controlled manner should be observed. In this framework, the structures in Aygüneş (2013)/ Aygüneş et.al. (2021) that include person and number mismatches were reconstructed to reflect the appearance in the subject DP and the IP head. In experiment sets, subjects were formed with the 1st P, Sg (*ben*, I), 1st P, Pl (*biz*, we), 2nd P, Sg (*sen*, you), and 2nd P, Pl (*siz,* you). 100 sentences, including person and number mismatches, were included in the analysis. The subject-object-verb sequence was used in all sentences, and the past tense suffix *–DI* was used in all verbs.

Table 1 *Sample of the experiment set*

	Person mismatch	**Number mismatch**	**n**
Ben yemeğ-i I food-Acc.	yap-tı-n cook-Past-2nd Sg.	yap-tı-k cook-Past-2nd Pl.	100
Sen kahveyi You coffee-Acc.	iç-ti-m drink-Past-1st Sg.	iç-ti-niz drink-Past-1st Pl.	100
Biz tahta-yı We board-Acc.	sil-di-niz clean-Past-2nd Pl.	sil-di-m clean-Past-1st Sg.	100
Siz müze-yi You museum Acc.	gez-di-k visit-Past-1st Pl.	gez-di-n visit-Past-2nd Sg.	100
Total	100	100	400

3.3. Data Analysis: In this study, statistical analysis was carried out in two areas, namely the subject DP and the IP head. The first of the analyses was designed to reveal the relationship between the person (first person-second person) and number (singular-plural) features in the Subject DP (Table 2). For this purpose, the Subject DPs were kept constant, and the person and number mismatches in the IP head were formed in a way to represent the 1st/2nd person and singular/plural forms homogeneously (1st Sg, 2nd Sg, 1st Pl, 2nd Pl); thus the effect seen could be ascribed to be belonging to the argument that was kept constant, namely the Subject DP. Repeated measure ANOVA was used in the statistical analysis process.

The factors in statistical analysis were as follows: Person (two levels: first person, second person) × Number (two levels: singular, plural) × mismatch (two levels: person mismatch, number mismatch) × ROI (two levels: frontal, parietal) × Hemisphere (two levels: left, right). Greenhouse-Geisser correction (Greenhouse-Geisser

1959) was applied to all repeated measures with more than one degree of freedom in the numeration.

Table 2 *The analysis set in which person and number features in the Subject DP are examined*

1st Person	**Singular**	Ben	okul-a	git-ti-n
		I (1st P, Sg)	school-DAT	go-PAST-2nd P, Sg
		Ben	okul-a	git-ti-k
		I (1st P, Sg)	school-DAT	go-PAST-1st P, Pl
	Plural	Biz	okul-a	git-ti-niz
		We (1st P, Pl)	school-DAT	go-PAST-2nd P, Pl
		Biz	okul-a	git-ti-m
		We (1st P, Pl)	school-DAT	go-PAST-1st P, Sg
2nd Person	**Singular**	Sen	okul-a	git-ti-m
		You (2ndP, Sg)	school-DAT	go-PAST-1st P, Sg
		Sen	okul-a	git-ti-niz
		You (2ndP, Sg)	school-DAT	go-PAST-2nd P, Pl
	Plural	Siz	okul-a	git-ti-k
		You (2ndP, Pl)	school-DAT	go-PAST-1st P, Pl
		Siz	okul-a	git-ti-n
		You (2ndP, Pl)	school-DAT	go-PAST-2nd P, Sg

The second analysis aimed to determine the relationship within person features (first person, second person) and within number features (singular, plural) in the IP head (Table 3). Contrary to the first analysis, the verb inflections were kept constant in this analysis. The person and number features in the subject DP were designed to represent the first person/second person and singular/plural forms homogeneously. The same approach was followed in this statistical analysis, as in the first analysis.

The factors in the analysis in which repeated-measures ANOVA was used are as follows: Person (two levels: first person, second person) × Number (two levels: singular, plural) × Mismatch (two levels: person mismatch, number mismatch) × ROI

(two levels: frontal, parietal) × Hemisphere (two levels: left, right). Greenhouse-Geisser correction (Greenhouse-Geisser 1959) was applied to all repeated measures with more than one degree of freedom in the numeration.

Table 3 *Analysis set in which the person and number features were tested in the IP head.*

Sen	okul-a	git-ti-m			
You (2ndP, Sg)	school-DAT	go-PAST-1st P, Sg	Singular		
Biz	okul-a	git-ti-m			
We (1st P, Pl)	school-DAT	go-PAST-1st P, Sg			1st Person
Siz	okul-a	git-ti-k			
You (2ndP, Pl)	school-DAT	go-PAST-1st P, Pl	Plural		
Ben	okul-a	git-ti-k			
I (1st P, Sg)	school-DAT	go-PAST-1st P, Pl			

Ben	okul-a	git-ti-n			
I (1st P, Sg)	school-DAT	go-PAST-2nd P, Sg	Singular		
Siz	okul-a	git-ti-n			
You (2ndP, Pl)	school-DAT	go-PAST-2nd P, Sg			2nd Person
Biz	okul-a	git-ti-niz			
We (1st P, Pl)	school-DAT	go-PAST-2nd P, Pl	Plural		
Sen	okul-a	git-ti-niz			
You (2ndP, Sg)	school-DAT	go-PAST-2nd P, Pl			

In this analysis set, the IP head was grouped to include 1stP and 2ndP. In contrast to the first analysis set, the IP head represents the 1st person, while the Subject DP includes 1st Sg, 1stPl, 2nd Sg, and 2nd Pl. The same was true for the 2nd P. Therefore, the person and number features in the Subject DP were distributed homogeneously. As a result, the effect seen in this analysis set was due to the IP head.

3.4. Procedure: We presented the sentences visually and word by word in the ERP experiments. In the presentation of stimuli, the fixation marker remained on the screen for 1000 ms, followed by a 300 ms blank screen, and the words were presented for 500 ms, and a 300 ms blank screen was left between words.

3.5. EEG Recording: EEG recordings were performed with the 32-channel BrainAmp system placed according to the International 10/20 system, and unipolar EEG recording was made as referenced on-line to linked ear-lobes. Electrode impedances are kept at 10 kΩ in EEG recordings, the sampling rate is 500 Hz, and bandpass Butterworth filters (0.1-15Hz) are administered to the EEG signals. In this study, similar to Aygüneş (2013) /Aygüneş et.al. (2021), left-frontal (F3, F7, FC3, FT7), right-frontal (F4, F8, FC4, FT8), left-parietal (CP3, TP7, P3, P7) and the right parietal (CP4, TP8, P4, P8) areas were grouped to form regions of interest. Statistical analyses were performed in 270-450 ms and 500-750 ms time windows as time-locked to the stimulus presentation.

4. Results

4.1. First Analysis: Findings regarding the person and number features in the subject DP.

4.1.1. 270-450 ms time window: It was found that negativity (N400) occurred in the centro-parietal area in this time window, where the effect created by the Subject DP was examined. The effect of subject DP was examined, and a statistically significant difference, $F(1,33) = 8.856$, $p < 0.001$, in the main effect of Person condition was found. When the mean amplitudes were examined, we found that the second person led to larger negativity (Figure 6, Figure 10 Panel A1). In other words, more cognitive resources were required for the processing of the second person than the first person, regardless of the mismatch conditions.
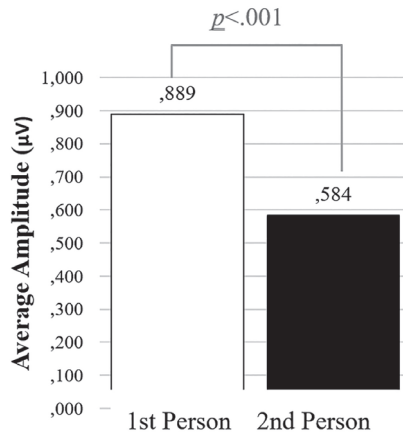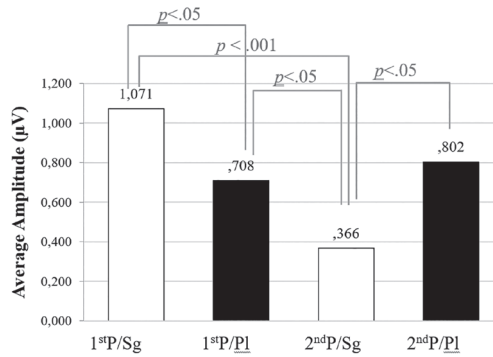

In this figure, the effect created by the 1st P and 2nd P in the Subject DP in a time window of 270-450 ms is presented. The values reflect the average am-

plitude values obtained from all scalp electrodes.

Figure 6. Average amplitudes of the first person and second person in subject DP

The analysis showed no significant difference in the main effect of Number (singular, plural) in terms of the effect created by the subject DP, $F(1,33) = 0.097$, $p>0.05$. On the other hand, there was a significant difference in Person × Number interaction, $F(1,33) = 15.283$, $p< 0.001$. In pairwise comparisons, between first person-singular and second person-singular, $F(1,33) = 22.991$, $p< 0.001$, and between first person-singular and first person-plural, $F(1,33) = 6.350$, $p< 0.05$, statistically significant difference was found. In addition, there was a significant difference between second person-singular and second person-plural, $F(1,33) = 6.912$, $p< 0.05$ and between second person-singular and first person-plural, $F(1,33) = 4.708$, $p<0.05$. The average amplitudes created by the Person × Number interaction are as follows (Figure 7, Figure 10 Panel A2):

In this figure, the effect created by the Person x Number interaction in the Subject DP in a time window of 270-450 ms is presented. The values reflect the average amplitude values obtained from all scalp electrodes.

Figure 7. Average amplitudes of person and number interaction in the subject DP

While examining in terms of person and number features in the DP, it was found that the second person elicited the largest negativity while the first person elicited the least negativity.

In this time window, no significant difference was found in the interaction of Person × Mismatch, $F(1,33) = 0.010$, $p>0.05$. In other words, the difference between person mismatch and number mismatch emerges independently from the first and second person in the subject DP.

4.1.2. 500-750 ms time window: In this time window, that positivity (P600) was observed in all conditions (Figure 9 - Panel A1, Panel A2). However, there was no significant difference between the first person and the second person, F (1,33) = 0.460, p>0.05, between the singularity and the plurality, F (1,33) = 0.002, p>0.05, and between the person mismatch and the number mismatch, F (1,33) = 3.694, p>0.05.

**4.2. Second Analysis: Findings regarding the features of person and number in the IP head:**

4.2.1. 270-450 ms time window: When this time window was evaluated within the framework of the effect created by the IP head, unlike the subject DP, there was no statistically significant difference in the main effect of Person, F(1,33)=0.010,p> 0.05, and the Number, F(1,33)=0.019,p> 0.05, in the IP head (Figure 9).However, we found that the person × number interaction creates a statistically significant difference, F (1,33) = 15.283, p < 0.001. When the person × number interaction was examined in pairwise comparisons, it was found that between first person singular and second person-singular, F (1,33) = 5.937, p< 0.05, and between first person singular and first person-plural, F (1,33) = 5.012, p< 0.05, there is a statistically significant difference as well as between second person-singular and second person-plural, F (1,33) = 5.633, p< 0.05, and between first person-plural and second person-plural, F(1,33) = 8.002, p< 0.01. Average amplitudes created by person × number interaction in the IP head are as follows (Figure 7, Figure10 – Panel B):
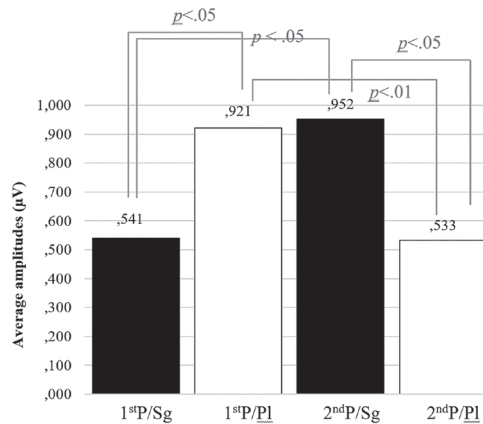
In this figure, the effect created by the Person x Number interaction on the IP Head is presented in a time window of 270-450 ms. The values reflect the average amplitude values obtained from all scalp electrodes.

**Figure 8**. Average amplitudes of person and number interaction in the IP head

Another difference between the IP head and the subject DP was observed in Person × Mismatch interaction. Contrary to the effect created by the subject DP, a significant difference in the person × mismatch interaction in the IP head was found, $F(1,33) = 8.856$, $p < 0.01$. While looking at the average amplitudes, we found that in the IP head, the person mismatch elicited larger negativity in the first person compared to the number mismatch. In contrast, in the second person, person and number mismatches led to a similar effect (Figure 8).
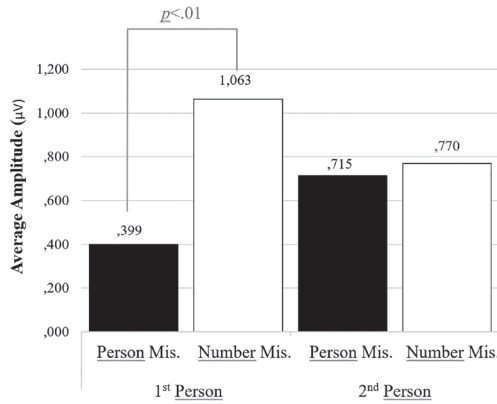
In this figure, the effect created by the Person x Mismatch interaction on the IP Head in a time window of 270-450 ms is presented. The values reflect the average amplitude values obtained from all scalp electrodes.

Figure 9. Average amplitudes of person - mismatch interaction in the IP head

4.2.2. 500-750 ms time window*:* In this time window, no significant difference was found in the main effect of the Person, $F(1,33) = 0.269$, $p > 0.05$, the Number, $F(1,33) = 0.099$, $p > 0.05$, and the Mismatch, $F(1,33) = 3.694$, $p > 0.05$ and interactions with these conditions (Figure 10 - Panel B).
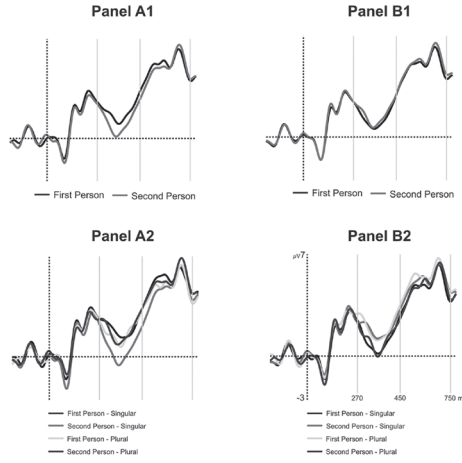
Panel A1: ERP responses created by the first person and second person in the Subject DP, Panel A2: ERP responses created by singular and plural forms of first and second persons in the Subject DP, Panel B1: ERP responses created by the first person and second person in the IP Head, Panel A2: ERP responses created by singular and plural forms of first and second persons in the IP Head.

Figure 10. Grand average ERP responses in the Pz electrode to the stimulus presentation of the conditions in the first and second analyzes.

4.3. Discussion

4.3.1. Person hierarchy in the Subject DP and the IP head (1stP > 2ndP or 2ndP > 1stP): Analyses made in the first-time window indicate that the person features in the subject DP and IP head have different effects. While there is a 2nd P> 1st P hierarchy between the first person and the second person in the subject DP, there is no difference between the first person and the second person in the IP head. Such a difference between the subject DP and the IP head may occur because the person features in the subject DP are interpretable, but they are uninterpretable in the IP head and hence dependent on the DP's interpretable person/number features that engage in feature checking, and also the fact that the subject DP is equipped with D-features.

The 2ndP> 1stP hierarchy in the subject DP is compatible with Harley and Ritter (2002). Harley and Ritter (2002) argue that in the presentation of the first and second person in the participant phrase, the [addressee] feature is more marked in the second person, but the second person is more marked than the first person since the [speaker] is

not presented in the first person. This study supports this argument because it revealed that larger negativity was elicited in the second person in the subject DP than the first person, so more cognitive resources were needed to process the second person and the second person was cognitively more marked. In the first person and second person constructions included in the analysis set in the subject DP and the IP head, it was seen that the features of the subject DPs in the subject position are as in (1) and (2):

Table 4. *Features of the subject DP in the first and second analysis set*

(1)   Features of the subject DP in the first analysis set

a.

1st Person	Singular	Ben I (1st P, Sg) PARTICIPANT	okul-a school-DAT	git-ti go-PAST	-n 2nd P, Sg
		Ben I (1st P, Sg) PARTICIPANT	okul-a school-DAT	git-ti go-PAST	-k 1st P, Pl
	Plural	Biz We (1st P, Pl) PARTICIPANT (ADDRESSEE)	okul-a school-DAT	git-ti go-PAST	-niz 2nd P, Pl
		Biz We (1st P, Pl) PARTICIPANT (ADDRESSEE)	okul-a school-DAT	git-ti go-PAST	-m 1st P, Sg

b.

2nd Person	Singular	Sen You (2ndP, Sg) PARTICIPANT ADDRESSEE	okul-a school-DAT	git-ti go-PAST	-m 1st P, Sg
		Sen You (2ndP, Sg) PARTICIPANT ADDRESSEE	okul-a school-DAT	git-ti go-PAST	-niz 2nd P, Pl
	Plural	Siz You (2ndP, Pl) PARTICIPANT ADDRESSEE	okul-a school-DAT	git-ti go-PAST	-k 1st P, Pl
		Siz You (2ndP, Pl) PARTICIPANT ADDRESSEE	okul-a school-DAT	git-ti go-PAST	-n 2nd P, Sg

(2)   Features of the subject DP in the <u>second analysis</u> set

a.

Sen You (2ndP, Sg) *PARTICIPANT* *ADDRESSEE*	okul-a school-DAT	git-ti go-PAST	-m 1st P, Sg	Singular	1st Person
Biz We (1st P, Pl) *PARTICIPANT* *(ADDRESSEE)*	okul-a school-DAT	git-ti go-PAST	-m 1st P, Sg		
Siz You (2ndP, Pl) *PARTICIPANT* *ADDRESSEE*	okul-a school-DAT	git-ti go-PAST	-k 1st P, Pl	Plural	
Ben I (1st P, Sg) *PARTICIPANT*	okul-a school-DAT	git-ti go-PAST	-k 1st P, Pl		

b.

Ben I (1st P, Sg) *PARTICIPANT*	okul-a school-DAT	git-ti go-PAST	-n 2nd P, Sg	Singular	2nd Person
Siz You (2ndP, Pl) *PARTICIPANT* *ADDRESSEE*	okul-a school-DAT	git-ti go-PAST	-n 2nd P, Sg		
Biz We (1st P, Pl) *PARTICIPANT* *(ADDRESSEE)*	okul-a school-DAT	git-ti go-PAST	-niz 2nd P, Pl	Plural	
Sen You (2ndP, Sg) *PARTICIPANT* *ADDRESSEE*	okul-a school-DAT	git-ti go-PAST	-niz 2nd P, Pl		

While in (1b), all pronouns in the subject position have the participant and addressee features, in (1a), it is seen that pronouns in the subject position have only participant features or selective addressee features due to the inclusive interpretation of *biz* pronoun. Therefore, when looking at the person features in subject DP in (1), it is seen that the second person (1b) has more features than the first person (1a); in other words, it is more marked. If we apply our analysis of the markedness to the IP heads in (2), it is similarly seen that the second person inflections in (2b) are more marked

than the first person inflections in (2a). However, the findings regarding this analysis set are not in this direction. As mentioned earlier, there is no significant difference between (2a) and (2b). In this case, when we do the analysis not according to the features in the IP head, but the features in the subject DP, an equal condition is observed between (2a) and (2b) in terms of the distribution of the features. That is why there is no significant difference between (2a) and (2b). In short, since person features in the IP head are uninterpretable, there is no point in searching for a difference in markedness between person features in the IP heads. In syntax, person features in the IP head get their values from the subject DP (Chomsky 2000).

These findings demonstrate that the increase in negativity is directly related to the increase in the markedness of the person features in the subject DP. In (2b), it is seen that larger negativity is formed since the person features in subject DP are more marked than in (2a); in other words, more cognitive resources are needed in processing. However, there is no difference between the person features in processing, in the IP head since person features are not loaded with values.

4.3.2 Number hierarchy in the Subject DP and the IP head (Plural> Singular or Singular > Plural): When the number feature was examined as a whole, no difference between singularity and plurality was found in both the subject DP and the verb inflection. Regardless of the form of mismatch, it was seen that singularity and plurality do not make a difference either in the subject DP or the IP head. Chomsky (1995) divides grammatical features into two groups as intrinsic and optional. While the intrinsic features are an integral part of the lexical item, the optional features are determined in the numeration. In this framework, it is suggested that the number feature is optional; in other words, there is no need for a separate head for the number feature, and this relation is formed by adding to the word in the numeration. Panagiotidis (2002) combines these two views by evaluating the number feature's intrinsic and optional nature and states that the number feature is not interpretable in the subject DP. Similarly, Nevins (2011) states that the person feature [± participant] shows a binary feature such as [± speaker], while the number feature is weak and has only the [+ plural] feature. Therefore, it is seen that the cognitive markedness of the number feature is a weak feature both in the IP head and in the subject DP, and the number feature effect becomes marked when it interacts with the person feature.

4.3.3. Person and number interaction in the subject DP and IP head: In the study, mainly, it is seen that there is a difference in terms of person features between the subject DP and the IP head. While there is a hierarchical structuring in the form of 2ndP> 1stP in the subject DP, it is in the form of 1stP = 2ndP in the IP head. In the number feature, although there is no difference between the subject DP and the IP head (Sg= Pl) when the person × number interaction is examined, it is seen that different forms are displayed between the subject DP and the IP head. However, as emphasized by Panagiotidis (2002), the interaction of person and number features does not mean that these features come together in a singular structure to act together, but rather that the person who offers discursive information and the number that offers numerical information come together within the compositional fashion. When evaluated in this context, it is seen that the second person singular elicits larger negativity compared to the first person-singular in the subject DP (2ndP Sg> 1stP Sg), while the first person-singular elicits larger negativity in the IP head (1stP Sg>2ndP Sg). In plural forms, it is seen that the second person-plural interaction in the IP head elicits larger negativity than the first person-plural interaction (2ndP Pl >1stP Pl). No statistically significant difference between the first person plural and the second person-plural in the subject DP (1stP Pl= 2ndP Pl) is found (Table 5).

Table 5. *Person and number interaction in the subject DP and verb inflection*

	Subject DP	IP Head
Hierarchy of Person in Singularity	2ndP > 1stP	1stP > 2ndP
Hierarchy of Person in Plurality	1stP = 2ndP	2ndP > 1stP

We thought that the hierarchical structuring in Table 5 in both the subject DP and IP head is related to the markedness of the features of the subject DP. As seen in (3), in singular inflections, the second person (sen, you) has the [participant] and [addressee] features, while the first person (ben, I) has only the [participant] feature. For this reason, when looking at the [singularity] and first and second person interactions in the subject DP, it is found that the second person elicits larger negativity. In other words, the processing of the second person with more person features requires more cognitive resources than the first person (2ndP> 1stP). Whereas in (4), when the interaction of the first and second person with the plurality is examined, the first person (biz, we) and the second person (siz you) have the both [participant] and [addressee] features[1]; thus, no difference between these two persons which interact with the plurality is found (1stP = 2ndP).

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[1]It is assumed that the first plural pronoun has both [participant] and optional [addressee] features due to its inclusive interpretation in Turkish (biz= ben + sen (we=I+you)).

(3) *Subject DP (singular)* $2^{nd} P > 1^{st} P$

a.	**Ben**	okul-a	git-ti	-n/-k	1st *Person*
	I (1st P, Sg)	school-DAT	go-	2nd P, Sg / 1st P, Pl	
	PARTICIPANT		PAST		
b.	**Sen**	okul-a	git-ti	-m/-nız	2nd *Person*
	You (2ndP, Sg)	school-DAT	go-	1st P, Sg / 2nd P, Pl	
	PARTICIPANT		PAST		
	ADDRESSEE				

(4) *Subject DP (plural)* $1^{st}\ P = 2^{nd} P$

a.	**Biz**	okul-a	git-ti	-m/-niz	1st *Person*
	We (1st P, Pl)	school-DAT	go-	1st P, Sg / 2nd P, Pl	
	PARTICIPANT		PAST		
	(ADDRESSEE)				
b.	**Siz**	okul-a	git-ti	-n/-niz	2nd *Person*
	You (2ndP, Pl)	school-DAT	go-	2nd P, Sg / 2nd P, Pl	
	PARTICIPANT		PAST		
	ADDRESSEE				

Looking at the structuring in the IP head, it is found that person features in the subject DP are effective, instead of the person features in the IP head. As we have stated before, since person features in the IP head are uninterpretable features, there is no point in searching for a difference in markedness between person features in the IP head. However, in that case, there should be structured in the form of $2^{nd}P > 1^{st}P$ in singularity and first and second person interaction, and $1^{st}P = 2^{nd}P$ in plurality and first and second person interaction (5,6).

(5) *IP (singular)* $2^{nd}P > 1^{st}P$

a.	**Sen/Biz**	okul-a	git-ti	-m	1st *Person*
				1st P, Sg	
	You (2ndP, Sg) / We (1st P, Pl)	school-DAT	go-PAST	*PARTICIPANT*	
b.	**Ben/Siz**	okul-a	git-ti	-n	2nd *Person*
				2nd P, Sg	
	I (1st P, Sg) / You (2ndP, Pl)	school-DAT	go-PAST	*PARTICIPANT*	
				ADDRESSEE	

(6) *IP (plural)* $1^{st}\ P = 2^{nd}P$

a.	**Ben/Siz**	okul-a	git-ti	-k	1st *Person*
				1st P, Pl	
	I (1st P, Sg) / You (2ndP, Pl)	school-DAT	go-PAST	*PARTICIPANT*	
				(ADDRESSEE)	
b.	**Sen/Biz**	okul-a	git-ti	-niz	2nd *Person*
				2nd P, Pl	
	You (2ndP, Sg) / We (1st P, Pl)	school-DAT	go-PAST	*PARTICIPANT*	
				ADDRESSEE	

However, the findings indicates there is a hierarchical structuring in the form of 1^{st}P> 2^{nd}P in singularity and 2^{nd}P> 1^{st}P in plurality, unlike (5) and (6).

The reason for this is that although the person and number features in the subject DP show a homogeneous distribution (Table 6) when the person and number features in the IP head are examined in the interaction of the person and number features, the homogeneous distribution of person features among the compared structures is distorted (7,8). Although the first and second persons are compared in singularity and plurality in the IP head, it is seen that the person features in the subject DP are also effective. The features of the subject DPs in which the verb is inflected with the first person singular (7a) are more marked than the subject DPs in which the verb is inflected with the second person singular (7b). Therefore, a 1^{st}P> 2^{nd}P hierarchy is found. On the other hand, the features of the subject DPs in which the verb is inflected with the first-person plural (8a) are less marked than the subject DPs in which the verb is inflected with the second person plural (8b). This results in a hierarchy in the form of 2^{nd}P> 1^{st}P.

(7) *IP (singular)*   *$1^{st}P>2^{nd}P$*

a. **Sen/Biz**   okul-a   git-ti   -m   *1^{st}Person*
You (2nd P, Sg) / We (1st P, Pl)   school-DAT go-PAST 1st P, Sg
PARTICIPANT/ PARTICIPANT
ADDRESSEE/ (ADDRESSEE)

b. **Ben/Siz**   okul-a   git-ti   -n   *2^{nd}Person*
I (1st P, Sg) / You (2nd P, Pl)   school-DAT go-PAST 2nd P, Sg
PARTICIPANT/ PARTICIPANT
ADDRESSEE

(8) *IP (plural)*   *$2^{nd}P>1^{st}P$*

a. **Ben/Siz**   okul-a   git-ti   -k   *1st Person*
I (1st P, Sg) / You (2nd P, Pl)   school-DAT go-PAST 1st P, Pl
PARTICIPANT/ PARTICIPANT
ADDRESSEE

b. **Sen/Biz**   okul-a   git-ti   -niz   *2nd Person*
You (2nd P, Sg) / We (1st P, Pl)   school-DAT go-PAST 2nd P, Pl
PARTICIPANT/ PARTICIPANT
ADDRESSEE/ (ADDRESSEE)

This reveals that the hierarchy of person and number features in Turkish differs in the subject DP and the IP head. The difference between the person features seen in the subject DP unlike the IP head, is related to φ-features in the subject DP and the IP head. Another possible reason is that, unlike the IP head, the subject DP head contains D-features. In other words, we think that the D-features in the IP head is much more marked than the Extended Projection Principle (EPP) feature, causing a significant difference in the subject DP. However, such an explanation is a weak probability since it cannot explain the interaction between the D-features and φ-features. The main difference between φ-features in the subject DP and the IP head is that the φ-features in the subject DP are interpretable while φ-features in the IP head are uninterpretable. Therefore, since the person feature in the IP head is uninterpretable, it does not lead to a difference between the first and the second person in the IP head. In contrast, the person features in the subject DP is interpretable and leads to a difference between these features. It can be said that there is no significant difference in brain potentials due to the deletion of person features in the IP head before spell-out, while the fact that the person feature in the subject DP is interpretable in LF and causes larger negativity. In this case, it is seen that the structuring of person features in the subject DP and IP head is as follows.
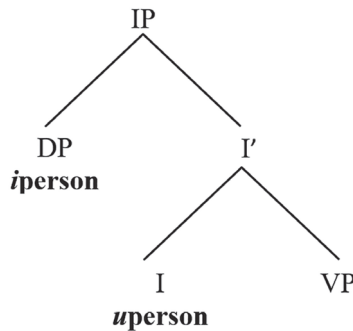

Figure 11. Structuring of personfeatures in the subject DP and IP head

Tsimpli (2003), and Tsimpli and Mastropavlou (2007) argue that interpretable features are available for second language (L2) speakers. However, uninterpretable features lead to difficulties in analyzing and determining L2 inputs. This finding in the L2 literature proves that more cognitive resources are needed to process interpretable

features; that is, the interpretable features are more marked. L2 speakers can more easily recognize the structures with higher cognitive markedness. In contrast to this, agrammatic individuals will use more cognitive resources to process interpretable features. In the case of agrammatism, units require more resources; that is, interpretable features are expected to be difficult. It is argued that the tense and aspect features require more effort than the agreement features in verb inflection in grammatical structures, and since they are interpretable features, tense and aspect are related to the need for more cognitive resources (Fyndanis et al. 2012; Nanousi et al. 2006). These findings in the literature on L2 and grammar support our argument. Namely, the type of features leads to the differences in the brain potentials between the subject DP and the IP head because the subject DP has interpretable features, unlike the IP head.

Conclusion

In this study, the processing of first and second person features and singular and plural structures in both subject DP and the IP head have been investigated.

The study findings show that in the subject DP, there is a hierarchical structuring between the first and second person in the form of $2^{nd}P > 1^{st}P$, and there is no hierarchical structuring ($1^{st}P = 2^{nd}P$) between the first person and the second person in the IP head. Such hierarchical structuring occurs in the subject DP, unlike the IP head, because the subject DP features are both interpretable and equipped with D-features.

The reason why in the subject DP there is a hierarchy in the form of $2^{nd}P > 1^{st}P$ is thought to be that in the presentation of the first and second person in the speech participant phrase, the [addressee] feature is presented in the second person, while the [speaker] is not presented in the first person. Therefore, the second person is more marked than the first person.

It is also found that the person features in the subject DP play a key role in the person × number interaction, which shows that the subject DP is pivotal in the agreement process. This difference is related to the presence of interpretable φ-features in the subject DP but uninterpretable φ-features in the IP head.

If we analyze the difference between singular and plural structures, there is no hierarchical structuring between singularity and plurality in the number feature, and this is pictured both in the subject DP and IP head. This shows that the number features are uninterpretable in the IP head and a weak feature in the subject DP.

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