

African Research Review

An International Multi-Disciplinary Journal, Ethiopia

Vol. 3 (3), April, 2009

ISSN 1994-9057 (Print)

ISSN 2070-0083 (Online)

A Study of the Use of the Weak Forms of English Grammatical Words by Educated Yoruba (Nigeria) English Speakers (Pp. 81-94)

Akinjobi, Adenike - English Department, University of Ibadan, Ibadan, Nigeria

E-mail: aa.akinjobi@mail.ui.edu.ng or nikjob@yahoo.com

+2348057331905

Abstract

More often than not, when grammatical words such as determiners, pronouns, conjunctions, auxiliary verbs and prepositions occur in Standard English sentences, they are produced in their weak forms. The concern of this study is whether educated Yoruba English speakers appropriately use the weak forms of English grammatical words in their sentences or not. One hundred Educated Yoruba English (EYE) speakers were made to read some English sentences into tapes and a perceptual analysis of the data was done. It was discovered that in most instances, educated Yoruba English speakers use strong sounds in the position of the expected weak forms and more often than not, strong vowels from the mother tongue were substituted for the weak sound / ə / which is the commonest vowel found in the weak forms of English grammatical words. Elision, which often occurs to English grammatical words, was also found not to manifest remarkably in this 'geo-tribal' variety of Nigerian English.

Introduction

English grammatical words manifest in two ways in spoken form - they could be strong or weak. They are strong when they are produced in citation form (i.e. in isolation) and in instances of contrastive stressing. However when they occur in sentences and there is no contrastive stressing, they are weak.

The weak forms are characterized by vowel reduction, especially by the manifestation of the schwa vowel, i.e. /ə/, in positions occupied by full vowels in the strong stressed forms. This work is therefore an investigation of whether educated Yoruba speakers of English make appropriate use of the weak forms of English grammatical words or not.

English Sentence Stress

When English words (whether grammatical or lexical) occur in isolation (i.e. in citation forms), they are produced in their strong forms. However when a phrase or sentence is produced, the stresses assigned to words in the word group become gradable. Grammatical words such as pronouns, conjunctions, determiners, prepositions, and auxiliary verbs, which are often one-syllable words, and which are usually stressed when they occur in isolation, consequently become unstressed (Colson, 1982; O'Connor, 1984; Crutenden, 1986; Roach, 1991; Onuigbo, 1996; Akinjobi, 2004; Iloilo, 2006; Wikipedia, 2008). Unstressing often results in vowel reduction which is an established phenomenon in Standard English (Carr 1999, Crosswhite 2001). According to Roca and Johnson (1999: 315): "The reduction of stressless vowels is one of the most characteristic traits of English".

Therefore, the strong vowels in English grammatical words have a tendency to reduce to /ə/ when they occur in sentences. This has been observed to contribute immensely to the typical rhythm of Standard English where there is alternation between stressed and unstressed syllables (Gimson 1975, Jowitt 1991, Hayes 1995, Roca and Johnson 1999)

The following are the grammatical words of English in their strong and weak instances of pronunciation and the environments in which each variant occurs:

Table 1
The Strong and Weak Forms of Standard English Grammatical Words

Words	Stressed Strong Forms	Unstressed Weak Forms	Contexts of weak variants
Determiners			
'a' (used only before a consonant sound)	/eɪ/	/ə/	All weak contexts
'an' (before vowels)	/æn/	/ən/ /n/	Every weak context except after /t/ or /d/
'the'	/ði:/	/ðə/ /ði/	Before consonants Before vowels
'some'	/sʌm/	/səm/	All weak contexts
Conjunctions			
'and'	/ænd/	/m/ /ɪ/ /ænd, ən/	After labials e.g. /get ʌp m gəʊ / After velars e.g. /bæg ɪ bæɡldʒ / Other weak contexts
'that'	/ðæt/	/ðət/	All weak contexts
'but'	/bʌt/	/bət/	All weak contexts
'or'	/ɔ:/	/ɒ/	All weak contexts
Prepositions			
'to'	/tu:/	/tə/ /tu:/	Before consonants Before vowels
'for'	/fɔ:/	/fə/ /fər/	Before consonants Before vowels
'from'	/frɒm/	/frəm/	All weak contexts
'of'	/ɒv/	/f/ /əv/	Before consonants All other weak contexts
'by'	/baɪ/	/bə/	All weak contexts
'at'	/æt/	/ət/	All weak contexts
Pronouns			
I	/aɪ/	/ə/	All weak contexts
'me'	/mi:/	/mə/	All weak contexts
'my'	/maɪ/	/mə/	All weak contexts

'you'	/jʊ:/	/jʊ/ /jə/	Before vowels Before consonants
'he'	/hi:/	/ɪ/	All weak contexts except at the beginning of a word group where /hi:/ is used.
'his'	/hɪz/	/ɪz/	All weak contexts except at the beginning of a word group where /hɪz/ is used.
'her'	/hɜ:/	/ə/	All weak contexts except at the beginning of a word group where /hɜ:/ is used.
'him'	/hɪm/	/ɪm/	All weak contexts
'their'	/ðeə/	/ðə/	All weak contexts
'them'	/ðem/	/ðəm/	All weak contexts
'us'	/ʌs/	/əs/	All weak contexts
Auxiliary Verbs			
'shall'	/ʃæl/	/ʃəl, ʃl/	All weak contexts
'should'	/ʃʊd/	/ʃəd/	All weak contexts
'would'	/wʊd/	/d/ /wəd/	After I, he, she, we, you, they Every other weak context
'will'	/wɪl/	/əl/ /ɪ/ /ɪ/	After vowels and /l/ After I, he, she, we, you, they After consonants except /l/
'must'	/mʌst/	/məst/	All weak contexts
'are'	/ɑ:/	/ə/ /ər/	Before consonants Before vowels
'were'	/wɜ:/	/wə/	All weak contexts
'was'	/wɒz/	/wəz/	All weak contexts
'is'	/ɪz/	/s/ /z/ /ɪz/	After /p, t, k, f, θ/After vowels and voiced consonants except /z,ʒ,d/ Used after /s, z, ʒ, dʒ, ʃ/
'do'	/dʊ:/	/dʊ/ /də/	Before vowels Before consonants
'does'	/dʊz/	/dəz/	All weak contexts

'am'	/əm/	/ m / / əm /	After I All other weak contexts
'has'	/hæz/	/əz/ /s/ /z/	After / s, z, ʃ, dʒ, tʃ / After /p, t, k, f, θ, / All other weak contexts except at the beginning of a word group where /hæz/ is used.
'have'	/hæv/	/v/ /əv/	After I, we, you, they All other contexts except at the beginning of a word where /hæv/is used.
'be'	/bɪ/	/bɪ/	All weak contexts
'had'	/hæd/	/d/ /əd/	After I, he, she, we, they, you Every other context except at the beginning of a word group where /hæd/ is used.
'can'	/kæn/	/kən, kn/	All weak contexts

(Adapted from Wise 1957, O, Connor 1975, Roach 1991, Akinjobi 2000, 2004)

Yoruba

In view of the large number of languages in Nigeria, and the numerous language groups with their linguistic peculiarities that make use of English as a second language in Nigeria, educated Yoruba speakers of English have been selected as the population for current research.

Yoruba is one of the languages with large numbers of speakers in Nigeria. It has been observed to have about eighteen million, eight hundred and fifty thousand (18, 850,000) speakers (Ethnologue: internet source). It is spoken by people in the south western part of Nigeria in areas such as Oyo, Ogun, Ekiti, Osun, Ondo, Kwara, Lagos, parts of Kogi and Edo State, United States of America and United Kingdom. Yoruba belongs to the Yoruboid Group of languages that also belongs to the Benue Congo of Niger Congo

Research Methodology

The data for this study was gathered by making one hundred educated Yoruba English speakers read a prepared text into a voice recorder. A prepared text was used for gathering the data so as to be sure that the specific language items being investigated would be produced by the subjects.

However the extraneous variable of naturalness was taken care of by designing the text in a manner that the subjects were not aware of the specific language items being tested. The subjects' output was transcribed and sorted out according to each item under investigation.

The data was analyzed perceptually by counting the tokens of occurrence of the various sounds that were produced where the weak forms of English grammatical words were expected. These were converted to simple percentages, and for each word, the variant with the highest percentage was taken as the norm.

Analysis

Pronouns and Prepositions in Unstressed Positions in English Sentences

Table 2

Words	RP	EYE Variants
'her' as /ə/	[ə]	[a] 76% [ɛ] 14% [ɛ] 10%
'to' as /tə/	[tə]	[tʊ] 46% [to] 43% [tə] 11%
'to' as /tʊ/	[tʊ]	[tʊ] 49% [to] 44% [tə] 7%
'for' as /fɔr/ before vowels	[fɔr]	[fɔ] 95% [fɔr] 5% [fɔr] 0
'for' as /fə/ before consonants	[fə]	[fɔ] 100%
'she' as /ʃ/	[ʃ]	[ʃ] 100%
'from' as /frəm/	[frəm]	[frɔm] 94% [frəm] 6%
'of' as /ɒv/	[ɒv]	[ɔf] 100% [ɒv] 0
'I' as /ə/	[ə]	[aI] 100%
'I'm' as /əm/	[əm]	[aIəm] 09% [am] 52% [am] 17% [aIem] 12% [əəm] 10%
'my' as /m/	[m]	[maI] 100% [mə] 0
'me' as /m/	[m]	[mI] 100%

'they' as /ðə /	[ðə]	[de] 54% [ðe] 34% [ðə] 12 %
'at' as /ət/	[ət]	[at] 84% [ət] 16%
'you' as /jʊ /	[jʊ]	[jʊ] 100%
'you' as /jə /	[jə]	[jʊ] 100% [jə] 0
'he' as /I /	[I]	[I] 85% [hI] 15%
'him' as /Im /	[Im]	[Im] 73% [hIm] 27%
Their' as /ðə /	[ðə]	[dea] 47% [ðea] 37% [ðeə] 16% [ðə] 0
'their' as /ðəɹ/	[ðəɹ]	[dea] 52% [ðea] 45% [ðear] 03%
'us' as /ʊs/	[ʊs]	[ʊs] 86% [ʊs] 14%
'his' as /Iz/	[Iz]	[Is] 100%

Her which was supposed to be produced as the weak form / ə / in the context of the passage was realized as the strong sound [a] 76% of the instances of occurrence, [ɛ] 14% of the instances, and as the appropriate weak sound /ə / only 10%. **To** was expected to be realized as /tʊ / before a vowel, and as /tə / before a consonant in its weak positions. The subjects realized the anticipated /tʊ / as [tʊ] 49%, as [to] 44% and as [tə] 7% of the instances of occurrence. In 46% of the instances of expected occurrence of [tə], it was realized as [tu], as [to] 43% of the instances, and as the appropriate [tə] a negligible 11% of the instances.

Where **for** was expected to be [fəɹ] before vowels and [fə] before consonants, it was realized as [fə] 95% of the instances and as [fɔɹ] in 5% of the instances of occurrence. The appropriate [fəɹ] was not realized at all and in all the instances tested, the expected [fə] was realized as [fə]. All the tested instances of **she** (/ʃI/) were realized as [ʃI]. **From** was realized as [frɒm] 94% of the instances of occurrence and as the appropriate [frəm] only 6% of the instances. All the instances of occurrence of **of** in the data gathered from the EYE subjects were realized as [ɔf] with none realizing the

appropriate [əv]. **I** which in Standard English sentences should be realized as / ð / was realized as the strong [ai] in all the instances of occurrence.

I'm which was expected to be realized as the weak / əm/ was produced as [am] with the strong vowel [a] 52% of the instances where it occurs, [aɛm] 17%, [aiem] 12%, [aiəm] 9% and only as the appropriate [əm] 10% of the instances. **My** was produced in all instances as [maɪ] with the strong diphthong [aɪ] while no instance of the appropriate /mə/ was realized. **Me** was realized as [mi] in all instances of occurrence while **they** which in Standard English is expected to be realized as /ðə/ was realized as [de] 54%, [ðe] 34%, and only as the appropriate [ðə] 12% of the instances of occurrence. **At** was produced as [at] a remarkable 84% of the instances while only 16% produced the appropriate [ət].

When **you** occurs before a vowel in Standard English it is realized as / jʊ / while it is realized as /jə/ when it occurs before a consonant. The EYE subjects produced both jʊ] and [jə] as [ju] in all the instances of occurrence making no distinction between the variant before a vowel and the one before a consonant. **He** was produced as [I] 85% of the instances and as [hI] 15%. The [ʊ] and [I] sounds substituted for Standard English by the EYE subjects are the nearest sounds to them in Yoruba language and they are stronger than the weak /ʊ/ and /I/ of Standard English. It should also be noted here that though the [h] of 'he' is elided; it could be viewed more as a feature of Yoruba language where /h/ as a sound is not remarkably phonemic rather than a conscious effort at unstressing.

Him was produced as [Im] 73% of the instances of occurrence and as [hIm] 27%. As in the case of the EYE elision of the /h/ in **he**, the elision of the /h/ in **him** also looks more as a result of the influence of the non-phonemic presentation of the /h/ sound in Yoruba language than a conscious effort at unstressing. Where **their** was expected to be produced as /ðə/ before a consonant, it was realized as [de] 47%, [ðe] 37% and [ðə] 16% of the instances. None of the instances of occurrence was realized as the appropriate [ðə]. Where **their** precedes a vowel and it was expected to be produced as / ðə /, it was realized as [de] 52%, [ðe] 45% and [ðeə] 3% with no instance realized as the appropriate / ðə / . Here too, the distinction was not made between the weak form before a vowel and that before a consonant. And in all the instances, strong vowels rather than weak ones were used. **Us** was realized as [ʊs] with the strong vowel [ʊ] 86% of the instances of

occurrence and only appropriately as [ə] a negligible 14% of the instances tested. *His* was realized in all instances as [is] by the EYE subjects.

Conjunctions in Unstressed Positions in English Sentences

Table 3

Words	RP	EYE Variants
'and' as /m/ after labials	[m]	[and] 47% [an]53% [m] 0
'and' as /ŋ/ after velars	[ŋ]	[an] 56% [and] 31% [am] 13% [ŋ] 0
'and' as / ən /, / ənd / in other contexts	[ən, ənd]	[an] 60% [and] 24% [ənd] 16% [ən] 0
'that' as / ðət / in weak contexts	[ðət]	[ðat] 51% [dat] 45% [ðət] 04%
'but' as /bət/ in weak contexts	[bət]	[bət] 100% [bət] 0
'or' as /ɔ/ in weak contexts	[ɔ]	[ɔ] 100%

The conjunction *and* is produced in Standard English as the syllabic / m / after labials, / ŋ / after velars and as / ən /, and / ənd / in other unstressed contexts. The EYE subjects realized / m / and / ŋ / as [an] 53% and 56%, as [and] 39% and 24% of their respective instances of occurrence. / ŋ / was realized as [am] 5% of the instances of its occurrence and non of the instances was realized as the appropriate /m/ or / ŋ /. In other weak contexts tested *and* was realized as [an] 60%, [and] 24% and as [ənd] only a negligible 16% of the instances of occurrence.

That which is expected to be weakened to / ðət / in English sentences was produced as [ðat] in 51%, [dat] in 45% and only as the appropriate [ðət] in a negligible 4% of the instances of occurrence of the expected / ðət /. *But* and *or* were produced as [bət] and [ɔ] in 100% of the instances of their expected

occurrence. None of the instances was realized as the appropriate weak / bəʔ / and / v /.

Determiners in Unstressed Positions in English Sentences

Table 4

Words	RP	EYE Variants
'a' as /ə/ before consonants	[ə]	[e] 85% [ə] 15%
'an' as /ən/ before vowels	[ən]	[an] 92% [ən] 08%
'the' as /ðə/ before consonants	[ðə]	[dɪ] 37% [ðɪ] 39% [ðə] 24%
'the' as /ði/ before vowel	[ði]	[dɪ] 35% [ðɪ] 42% [ðə] 23%
some as /səm/ in weak contexts	[səm]	[sɒm] 87% [səm] 13%

The determiners **a** before consonants and **an** before vowels are expected to be rendered in their weak forms /ə/ and /ən/ in Standard English. The EYE subjects produced **a** as the strong vowel [e] 85% and as the appropriate weak vowel / ə / 15 % of the instances of its occurrence. The word **an** was realized as the strong syllable [an] 92%of the instances and as the Standard English weak syllable [ən], 8% of the instances of production.

The is rendered as / ðə / before consonants and as / ðɪ / before vowels in Standard English. The EYE subjects realized /ðə/ as [ðɪ] 39%, [dɪ] 37% and only as the appropriate [ðə] 24% of the instances of production. Where **the** occurred before a vowel and was expected to be produced as /ði/, it was produced as [ðɪ] 42%, [dɪ] 35% and as [ðə] 23% of the instances of use. **Some** was realized in 87% of the instances of production as [sɒm] with the strong vowel [ɔ] rather than the weak vowel [ə] and only as the appropriate [səm] a negligible 13% of the instances of use.

Auxiliary Verbs in Unstressed Positions in English Sentences
Table 5

Words	RP	EYE Variants
'shall' as /ʃəl/	[ʃəl]	[ʃal] 84% [ʃəl] 16%
'should' as /ʃəd/	[ʃəd]	[ʃʊd] 100% [ʃəd] 0%
'would' as /wəd/	[wəd]	[wʊd] 100% [wəd] 0%
'have' as /əv/	[əv]	[av] 85% [hav] 15% [əv] 0
'had' as /əd/	[əd]	[ad] 58% [had] 42% [əd] %
'was' as /wəz/	[wəz]	[wɔs] 100% [wəz] 0
'were' as /wə/ before consonants	[wə]	[wɛ] 42% [wɛ:] 18% [wa] 25% [wə] 15%
'were' as /wə/ before vowels	[wə]	[wɛ] 45% [wɛ:] 13% [wa] 31% [wə] 11% [wə] 0
'does' as /dəz/	[dəz]	[dɔs] 100%
'is' as /z/	[z]	[Is] 88% [z] 12%
'be' as /b/	[b]	[bI] 100%
'has' as /əz/	[əz]	[as] 87% [az] 13% [əz] 0
'I'm' as /əm/	[əm]	[am] 79% [aIəm] 21% [əm] 0
'will' as /əl/ after vowels and /l/	[əl]	[wɪl] 72% [wɪ] 22 [l] 06%
'must' as /məst/ in all weak contexts	[məst]	[mɔst] 100% [məst] 0
'are' as /ə/ before consonants	[ə]	[a] 100% [ə] 0
'are' as /ə/ before vowels	[ə]	[a] 97% [ar] 03%

		[ʊr] 0
'do' as /dʊ/ before consonants	[dʊ]	[dʊ] 100% [dʊ] 0
'do' as /dʊ/ before vowels	[dʊ]	[dʊ] 100% [dʊ] 0

Shall which in weak contexts should be realized as /ʃəl/ was realized as [ʃal] with the strong vowel [a] 84% and as the appropriate [ʃəl] 16% of the instances in which it occurred in the passage. **Should** and **would** were produced as [ʃʊd] and [wʊd] with the strong vowel [u] in all the instances of their occurrence (i.e. 100%). At no instance were they produced as their appropriate weak forms /ʃəd/ and /wəd/. Where **have** was expected to be realized as /əv/, the EYE subjects produced [av] 85% of the instances and [hav] with the strong vowel [a] 15% of the instances. At no instance was the appropriate weak form [əv] realized. Where **had** was expected to be realized as /əd/, the Eye subjects produced [ad] 58% of the instances and [had] 42% of the instances of expected occurrence. The appropriate weak /əd/ was not produced in any instance. **Was** was produced as [wəs] with the strong vowel [ɔ] in all instances and at no instance as the expected weak form /wəz/.

Were was realized as [wɛ] 42% of the instances, [wa] 25%, [wɛ:] 18%, and as the expected [wɛ] before consonants, only a negligible 15% of the instances of production. It could be noted here that 85% of the sounds substituted for the weak sound /ə/ were strong vowels. Where **were** should be produced as /wɛr/ before vowels in word groups in Standard English, it was produced as [wɛ] 45% of the instances, [wa] 31%, [wɛ:] 13%, as its weak counterpart [wə], 11% and at no instance as the appropriate weak form [wɛr]. With this variant too, strong vowels were substituted for the weak vowel /ə/ in 89% of the instances of its occurrence and no distinction was made between the form of the word to be used before a consonant and the one before a vowel.

Does was produced in all the instances of its occurrence in the passage as [dɔs] rather than the weak form /dəz/. **Is**, expected to be produced as /z/ after vowels and voiced consonants except /z, ʒ, dʒ/, was realized by the EYE subjects as [is] 88% and [z] only 12% of the instances of occurrence. The auxiliary verb **be** was produced as [bi] in all instances of occurrence while **has** which should have the weak form /əz/ in word groups was produced as [as] 87% and [az] with the

strong vowel [a] 13% of the instances of expected production of /əz/. The appropriate /əz/ was not produced at any instance.

The contracted *It's* which is expected to be realized as /ɪts/ was realized as [am] 79% and [aiɪts] 21% of the instances of occurrence. /ɪts/ was not realized in any of the instances by the EYE subjects. *Will* before vowels and /l/ should be realized as /ɪl/. It was however produced as [wɪl] 72% of the instances, [wɪ] 22% and as /l/ 6% of the expected instances of occurrence for the appropriate /ɪl/.

In all the instances tested *must* and *are* were produced as [mʌst] and [a] with the strong vowels [ɔ] and [a] rather than the appropriate weak [mʌst] and [ə]. Where *are* occurs before a vowel and was expected to be realized as [ər], it was produced as [a] 97% of the instances and as [ar], with the strong vowel [a], 3% of the instances. It was not produced as the appropriate /ər/ in any of the instances. *Do* was expected to be produced as /dʊ/ before consonants and as /dʊ/ before vowels. It was however realized in all the instances tested for both /dʊ/ and /dʊ/ as [du].

Results

It has been discovered through this study that the weak forms of English grammatical words such as determiners, conjunctions, pronouns and auxiliary verbs are scarcely used in Educated Yoruba English. No contrasts were drawn in the use of these words by the EYE subjects who retained them in the same form in both strong and weak contexts.

EYE speakers have a tendency to substitute the strong vowel sounds from Yoruba language for the weak /ə/ sound of English in most cases. Consequently, this sound, which is the commonest vowel found in the weak forms of Standard English grammatical words, is scarcely used by the EYE speakers. This has a very remarkable influence on the typical rhythm of educated Yoruba English.

Elision, one of the characteristic traits of unstressing in Standard English is almost absent in EYE. Where vowels could be totally elided in the weak forms of these grammatical words as in *can* /kn/ and *shall* /ʃl/, where syllabic consonants should constitute the peaks of the unstressed syllables, strong Yoruba vowels are often inserted. All these confirm a preponderance of the

strong forms of English grammatical words and a tendency to use strong vowels in Educated Yoruba English.

References

- Akinjobi, A.A (2000). 'An Introduction to English Phonetics and Phonology' in Babajide A O (ed.) *Studies in English Language*, Ibadan, ECFP 5-24
- Akinjobi, A.A (2004). 'A Phonological Investigation of Vowel Weakening and Unstressed Syllable Obscuration in Educated Yoruba English' – Unpublished doctoral thesis, University of Ibadan
- Carr, P (1999). *English Phonetics and Phonology: An Introduction* Blackwell Publishers USA
- Colson, G (1982). *Voice Production and Speech*, London: Pitman Books
- Crosswhite, C (2001) 'Vowel Reduction in Optimality Theory' in Horn L (Ed) *Outstanding dissertations in Linguistics* NY Routledge 1-109
- Crutenden, A. (1986) *Intonation*, NY: Cambridge University Press.
www.ethnologue.com: Ethnologue accessed: 7/1/09
- Gimson, A C (1975) *A Practical Course of English Pronunciation: A Perceptual Approach*, London: Edward Arnold
- Hayes, B (1995). *Metrical Stress Theory* Chicago UCP
- Iloilo O.A (2006). *The Rhythm of Isoko English* an unpublished M.A. Project.
- Jowitt, D. (1991). *Nigerian English Usage: An Introduction*, Ibadan: Longman
- O,Connor, J D (1984). *Better English Pronunciation* Cambridge: CUP
- Onuigbo, S (1996). *Oral English for Schools and Colleges*, Onitsha: Africana-Fep Publishers
- Roach, P (1991). *English Phonetics and Phonology*, Cambridge: CUP
- Roca, I & Johnson W (1999). *A Course in Phonology* Blackwell Publishing Ltd, USA
- Udofot I M (2000). The 'Rhythm of Educated Spoken Nigerian English: An Alternative Description' A Paper Presented at the 22nd West African Languages Congress, WALC, University of Ghana ,Legon
- Wikipedia (2008). *Weak Form and Strong Form* retrieved on 2/1/2009
- Wise, C M (1957). *Applied Phonetics*, Englewood Cliffs, N J: Prentice Hall Inc.