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ANAPHORA AND THE BILINGUAL

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Anaphora interpretation is the cornerstone of Binding Theory. But is the bilingual's interpretation of the anaphora identical to that of the monolingual? And what does this indicate about the number and type of bilingual grammars?

To investigate these issues, two sets of experiments were carried out. The pilot was carried out in Oxford, using Oxford students and Japanese studying English in local language schools. The main experiment was carried out in Tokyo using school children and University students (none of them linguists). Subjects were divided into three groups: Anglophones, Japanese monolinguals, and Japanese/English bilinguals. Subjects completed, under controlled conditions, a socio-linguistic questionnaire, and a linguistic questionnaire asking for acceptability judgements of given interpretation of statements containing anaphora or acceptability judgements of statements containing anaphora. The linguistic questionnaires for bilinguals could be presented in Japanese or English. Combined with a priming text (which was in either Japanese or English, the contents of which had no relevance to the linguistic questionnaires) a bilingual could receive one of four different combinations.

The two sets of experiments used identical socio-linguistic questionnaires and priming texts. Both used an acceptability scoring system of 1 to 6 and scanner readable data input sheets.

The first experiment indicated that for some constructions monolinguals disagreed among themselves and that in most cases the bilinguals followed suite, although there were a number of cases for which the bilinguals' behaviour appeared to be different from that of the monolinguals.

The second experiment used the results of the first to enlarge the number of constructions under consideration in the Japanese questionnaire.

From the results of the two experiments it appears that bilinguals have separate sets of rules for their two languages. These are similar but not identical to those of their monolingual counterparts. In most, but not all, cases, the differences can be clearly traced to the influence of the second language. Additionally a non-negligible number of constructions, particularly in Japanese, do not behave as expected from the literature. In particular, respondents to the Japanese questionnaire, be they monolingual or bilingual, reject ambiguity. A relatively high degree of inconsistency is found across monolinguals, and an even higher degree of lack of self-consistency across Japanese monolinguals. There appears to be no mainstream grammar of a non-statistical nature capable of explaining all these results. A statistical type grammar would appear to be more adequate.

A number of ways are proposed for deepening the research in terms of bilingual acquisition, Japanese monolinguals' acceptance of ambiguity, etc. as well as in terms of a statistically versus a non-statistically based grammar.

ANAPHORA AND THE BILINGUAL

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1. Bilingualism

This chapter examines the status of bilingualism in the world. It examines a number of dimensions relevant to this study and touches on the implications of bilingualism for generative grammar. The categories into which studies in individual bilingualism fall are examined in some detail. A number of relevant psycho-linguistic studies in individual bilingualism are presented. Finally the material is drawn together into a set of assumptions and hypotheses for the study.

1.1 Bilingualism, a window into the mind

There are no books in the Oxford University library database entitled 'Monolingualism'. However, it is precisely a monolingual perspective, which is taken by modern linguistic theory as a starting point for dealing with basic problems such as grammars. Chomsky (1965) defines the scope of reference for the study of language as follows: 'Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogenous language community, who knows the language perfectly'.

From a global perspective, most of the world's speech communities use more than one language. Grosjean (1982) estimates that about half the world's population is bilingual and that bilingualism is present in practically every country in the world. It would appear that there are about thirty times as many languages as countries in the world. This does not take into account regional, social and stylistic variants within any given language. The greater resistance to linguistic assimilation on the part of recent immigrant groups is converting even Anglo-Saxon monolingual enclaves to bilingual territory: the USA is

now the 6th largest Spanish speaking country with the Spanish speaking population as one of the fastest growing social groups. Mackey (1967) suggests that ‘bilingualism, far from being an exception, is a problem which affects most of the world’s population’. The use of the word ‘problem’ in this context is interesting. It is not in the author’s experience that bilinguals or multilinguals regard their ability to communicate in more than one language as a problem. So, for whom is this really a problem?

An average educated person in Hyderabad may use Urdu in business, English at University, Sanskrit for religious purposes, Telegu at home, etc. In Eastern Europe, before the advent of the Iron Curtain, anybody with intellectual pretensions would bring up his children with French, German or English as a second language. In fact, in medieval Europe, for cultural and religious reasons, education included at least Latin as a second language and until relatively recently courses at Western Universities were held wholly in Latin. Even within areas of Europe, which are predominantly monolingual, the language ecology has changed drastically in the last decades due to an influx of foreign workers.

Since at least the beginning of the 20th century bilingualism has been treated as a disability by a large number of educational authorities. Even in Canada where French/English bilingualism is officially encouraged, other forms of bilingualism are not and as recently as two months ago the author is aware of a case in which a German family in Toronto was requested by their children’s school to stop using German at home.

The past couple of decades have seen an emerging awareness among linguistic theorists and psycholinguists that bilingualism is one of the most dynamic and promising areas of inquiry in cognitive science, and it ought not to be left to the sole attention of educators and politicians.

1.2 Universal Grammar

At the same time as bilingualism started to occupy the attention of linguists and psycholinguists, the proposal that language is an innate human capability also started to gain ground in its guise as Universal Grammar.

The theory of Universal Grammar (UG) states that there is an innate cognitive faculty, which makes language acquisition humanly possible. An important tenet of this theory is that this faculty is autonomous, i.e. it is an independent cognitive module, which may interact with other cognitive faculties but does not derive from them.

Chomsky (1980) summarises the mechanisms of UG and their role in language acquisition as follows: 'UG consists of a highly structured and restrictive system of principles with certain open parameters to be fixed by experience. As these parameters are fixed, a grammar is determined, what we may call a "core grammar".'

In this theory, the role of the principles (the cross-linguistically invariant properties of syntax common to all human languages) is to facilitate acquisition by constraining the learner's grammar, that is by reducing the learner's infinite hypothesis space to the set of human languages. The parameters express the highly restricted aspects in which

languages can differ syntactically and account for cross-linguistic variation or, otherwise said, the parameters allow for a limited number of ways in which the principles can be instantiated. The linguistic evidence available to the learner allows him to determine which parameter settings characterise the language he is in the process of acquiring.

If, indeed, Universal Grammar is universal, it must apply to all human beings, whether bilingual or monolingual. In the case of the bilingual an additional question must now be answered: does a bilingual have two separate grammars, one for each of his languages, or just one fused grammar resulting from a composite of the two grammars involved?

If a bilingual has a single grammar for his languages, this grammar is bound to have parameters different from either of those for the monolingual speakers of the two languages. If the bilingual has a separate grammar for each of his languages, the question to be answered is whether the parameter settings in his grammars are the same as for the appropriate monolinguals.

The experiments documented in the thesis attempted to address these questions in a restricted, well-documented domain of the grammar.

A number of studies have been carried out comparing bilingual development to grammatical development in one language. From an analysis of the available data it appears that certain aspects of linguistic development follow a monolingual pattern closely while others (e.g. acquisition of English grammatical morphemes by a child

exposed from birth to English and Chichewa – a Bantu language) don't. (Chimombo 1979). One such study is the DUFDE project (Meisel, 1990), in which detailed longitudinal descriptions of grammatical development of infants (aged from 1 to 3; 6 years of age) from mixed French-German families in Germany are analysed. Based on the assumption that UG does not require learning the properties of syntactic categories, but that the child must discover from the input in which way lexical items are assigned to various categories (Meisel, 1990: 16), linguistic descriptions are given for the acquisition of tense and aspect, prepositions, word-order regularities and case morphology, gender, verb agreement, tense, etc. Comparing the bilingual children's productions with those of two monolinguals, Meisel and his associates conclude that bilingual language acquisition does not differ in substantial ways from monolingual acquisition. They have also found some evidence that bilinguals are able to acquire certain grammatical constructions faster than monolinguals and succeed more easily at decoding underlying grammatical principles. As Meisel notes, these findings may be difficult to explain in terms of UG, which does assume that linguistic development is independent of cognitive development, considering that bilingual children have to acquire two languages simultaneously. It is, however, consistent with a more general approach to the cognitive approach in bilinguals, which assumes that early bilingual experience enhances cognitive processing. (See 1.3.1)

Recent developments in generative grammar, in particular the minimalist program, suggest that the computational system is the same for all languages, but that the differences reside only in the Saussurean arbitrariness linking form and meaning, and in

the individual feature specifications of lexical items. This sort of model potentially resolves some of the contradictions inherent in earlier generative models of UG and provides a good starting hypothesis for the locus of variation between languages. (see also chapter 2)

1.3 Background assumptions relating to Bilingualism

In their book, *Bilinguality and Bilingualism* (2000), J.F. Hamers and M. H. A. Blanc distinguish between individual bilingualism, which they term bilinguality and societal bilingualism.

Societal bilingualism refers to the state of a community in which two languages are in contact, with the result that two codes can be used in the same interaction and a number of individuals are bilingual.

Individual bilingualism is distinguished as the psychological state of an individual who has access to more than one linguistic code for communicative purposes; the degree of access to the two codes varying along a number of dimensions.

Societal bilingualism

Every bilingual community is situated between the two poles of a continuum, ranging from a set made up of two monolingual groups each containing a small number of bilinguals, to a single group with a fairly large number of members using the second language for specific purposes. Canada, for example, is somewhere in the middle and

exhibits territorial bilingualism; i.e. each group finds itself mostly within its own politically defined territory, with both languages having official status. (Witness two Francophone and two Anglophone Universities in Montreal).

The current experiment concentrated on individual bilingualism and was not concerned with the issues raised by societal bilingualism.

Individual bilingualism

A bilingual has been defined, at one extreme, as someone able to speak two languages perfectly (Bloomfield 1935), to the other extreme as anyone who possesses a minimal competence in one of the four language skills, i.e. listening comprehension, speaking, reading and writing, in a language other than his mother tongue (McNamara 1967).

Between these two extremes there are a plethora of definitions, e.g. Titone (1972) for whom bilingualism is 'the individual's capacity to speak a second language while following the concepts and structures of that language rather than paraphrasing his or her mother tongue'.

Not only do these definitions present a number of theoretical and methodological difficulties (e.g. what does it mean to speak a language perfectly) but they also refer to a single dimension of bilingualism, the level of proficiency in the two languages in question.

Hamers and Blanc (1989, 2000) suggest that a number of dimensions are relevant to individual bilingualism. In the following paragraphs, some of these dimensions are mentioned, together with their relevance to the present study.

One such dimension is the age of acquisition. Hamers and Blanc use this to define childhood bilinguality (second language acquired before 11 either simultaneously or in consecutive fashion), adolescent bilinguality (second language acquired between 11 and 17) and adult bilinguality (second language acquired after 17). The assumption in the background is that the result of the acquisition process is different in the three cases. The choice of subjects for our experiments was made on the basis of the age of first use of the language for normal communicative purposes (age of onset, AO). Data was collected about the age of acquisition. All the bilinguals fell into the childhood bilinguality category. Note that the use of age 11 for example to define childhood bilinguality is a controversial matter as nothing developmental appears to uniquely characterise this age. Other researchers, e.g. Grosjean, set this instead at 6. Even by this stricter criterion our data falls inside the realm of childhood bilinguality.

Another dimension of bilingualism is relative competence, which looks at whether the bilingual has a similar level of competence in both languages, although not necessarily in the same domains. If so, we are in the presence of balanced bilinguality. If this is not the case, then we are dealing with dominant bilinguality. All the bilinguals involved in the present study were judged by their schools to be balanced bilinguals. The judgement was carried out by teachers who themselves are bilinguals. The pupils in the schools are

taught in English and Japanese in groups that reflect their linguistic ability. Only pupils from the top group in both languages were selected. In the socio-linguistic questionnaire which they were requested to fill in as part of the study, subjects were asked whether they considered themselves more proficient in English or in Japanese, or equally proficient in both. Their responses did not seem to correlate with age and order of acquisition or with current and past usage and were therefore not used to distinguish between balanced and dominant bilinguality. This data could, however, be used in a future expansion of the study.

A further dimension of bilinguality is the socio-cultural status of the two languages. If both languages are considered of equal status, one is dealing with additive bilinguality (a set up in which acquisition of the two languages has an overall beneficial effect on the subject's development); otherwise, when one language is considered to have a superior status to the other, subtractive bilinguality (a set up in which acquisition of the two languages has an overall detrimental effect on the subject's development), is at play. Japanese and English have equal status in the Nishimachi and the American school in Tokyo, where many of the teachers are themselves bilingual. (The aim of the Nishimachi School is to produce balanced, bicultural bilinguals. The American school respondents, all of Japanese ethnic origin, were mainly Nishimachi graduates).

In order to achieve a relatively homogenous group of subjects, as conservative a choice was made as practical. For the purpose of the study, a bilingual was defined as someone who had started using both languages for normal communicative purposes by or before

the age of 12, has used them without break and is still using them. (All the bilinguals involved in the study turned out to have first come into contact with their two languages by or before the age of 12; most of them appeared to have started using both languages for normal communicative purposes by or before the age of 6, so all the others were eliminated from the analysis). The 'age of onset' (AO) data could be used in a further expansion of the study, which would involve in the bilingual category only those who had acquired the two languages simultaneously.

1.3.1 Studies in individual bilingualism

Studies in individual bilingualism can be regarded as falling into one of three categories: cognitive, neuropsychological and psycholinguistic. The cognitive aspect deals with the impact of bilingualism on cognition. The neuropsychological aspect looks at the bilingual's brain organisation in comparison to the monolingual. The psycholinguistic aspects deal with the way the bilingual processes and organises information using his two languages.

Cognitive aspects

Since the beginning of the 20th Century a controversy has raged on the positive or negative impact of bilingualism on children's development. The early studies (pre 1962) tend to document negative effects. As they can all be criticised on grounds of unsatisfactory methodology, in terms of controls, definition of bilingualism, etc., we will focus on the later studies starting with Peal & Lambert (1962). In contrast to earlier

research, great care was taken in their methodological design. This in turn had an impact on the way further experiments were designed. (See Hamers & Blanc 2000 for a comprehensive list of such experiments).

The majority of these experiments show a marked advantage in the bilingual's ability compared to the monolingual in areas such as:

Analytic processing of verbal input

Creativity - how this manifests itself appears to be a function of the languages involved

Awareness of the arbitrariness of language and of the relations between words

Perception of linguistic ability.

A number of hypotheses have been put forward to explain the cognitive advantages accruing from an early bilingual experience. Ben-Zeev (1977) distinguishes a number of mechanisms that allow the bilingual child to resolve interference at the structural level of language. According to Ben-Zeev the most important are:

a greater capacity for language analysis

sensitivity to feed-back cues from surface linguistic structures and/or verbal and

situational context, allowing rapid identification of the appropriate language

These two mechanisms, developed originally to respond to a bilingual environment, are especially important because of their potentially positive effects on symbolic processing in general. Ben-Zeev presents evidence that these mechanisms are generalised to other information-processing tasks and thus benefit the overall cognitive growth of the child.

There are, however, a number of studies documenting the negative effects of bilingualism. Most of those have been conducted in Western countries with children of minority groups schooled in the majority language.

Based on their own and other researchers' previous work, e.g. Lambert (1977), Hamers and Blanc (1989) postulate a model in which the distinction between additive and subtractive bilinguality is considered on a continuum which is the result of two dimensions. The first dimension deals with the cognitive function of language, more specifically with the ability to analyse language and control linguistic cues. The second dimension refers to the value that the child attributes to language. At the additive end of the continuum, the cognitive function of language is well developed and both languages are highly valued. Because the child attributes the same value to both languages, he will perceive them as interchangeable. This perception in turn will enhance the overall cognitive functioning. At the other end of the continuum the child is likely to develop a subtractive form of bilingualism. Indeed, when negative consequences are reported for bilingual experience, they invariably refer to a socio-cultural setting, which has the following characteristics:

the child comes from a socially disadvantaged subordinate group

he speaks a mother tongue which is little valued in the society at large and

he is schooled through a prestigious language, while the school system tends to ignore or denigrate his mother tongue.

Neuropsychological aspects

Researchers in the neuropsychology of language have developed a number of methodologies and techniques in order to assess language hemispheric processing and cerebral lateralisation. These include behavioural measures and anatomical/physiological measures.

The most widely used behavioural measures are:

Tachitoscopic techniques in which visual information is presented to one of the hemispheres; better recognition of material presented to one side is considered a measure of preference for the contra-lateral side.

Dichotic listening techniques are used to verify the dominance of one or the other hemisphere for auditory processing. Auditory materials are presented simultaneously to both ears; a better ear performance is considered an indication of the contra-lateral hemispheric preference.

Physiological and anatomical measures include:

The cortical mapping of speech function, used with brain surgery patients under local anaesthetic. Ojemann (1983), working with severe epileptics, stimulated various sites while patients were asked to perform various linguistic tasks. Behavioural impairment during the stimulation of a specified area is considered an indication of brain localisation of linguistic behaviour.

Non-invasive scanning techniques such as positron emission tomography (PET), functional magnetic resonance (fMRI) and magneto-encephalography techniques (MEG)

allow the researchers to pinpoint minute changes in blood flow during specific activities or in the magnetic field generated by neuronal aggregates.

Neuropsychological studies address a number of questions:

(1) Is cerebral organisation different in bilinguals and monolinguals?

Generally speaking the majority of the population has a dominant left hemisphere, which exercises contra-lateral control and controls most linguistic behaviour. Note that this does not necessarily equate with a neuro-anatomic structure and can also refer to an activation or inhibition of a pathway or to a preference in strategies. A large number of studies, carried out to check whether lateralisation in bilinguals differs from that of monolinguals, come out with contradictory results, to the point where one researcher, exasperated by the seemingly pointless investment of effort in the subject, wrote an article called 'enough already', pleading for research in this area to be stopped. More recent studies suggest a localisation in the left-hand hemisphere of the two languages, in other words there are some language specific areas. This is borne out by the results reported by Ojemann, who identified a large number of small areas related to language, in addition to the Wernicke and Broca areas. These small areas appear to be different from individual to individual and some of them are language specific.

(2) Are there separate neural mechanisms for each language?

Recent studies using neuroimaging techniques (Fabbro 1999) have shown that in fluent early bilinguals the cortical representation of the two languages was similar in both

Broca's and Wernicke's area. In fluent bilinguals who acquired their second language after the age of 10 the two languages exhibit different representations in Broca's area.

(3) Are there age-of-acquisition differences in cerebral processing?

Clinical and experimental evidence is contradictory. Most of the studies deal with consecutive, dominant bilinguals and seem to point towards greater RH processing in these bilinguals. The few studies referring to early, balanced bilinguals mention greater LH processing. Some recent neurophysiological evidence suggests that early and late bilinguals process grammar in a neurophysiologically different way. However, differences in age-of-acquisition are often indistinguishable from differences in learning situations.

(4) Do differences in learning situations, in competence and in language structure, have different effects on cerebral organisation?

The summarised evidence is in favour of a unified neuro-anatomic structure for the bilingual. Differences in learning situations might promote a differential use of the two hemispheres in language processing. Differences in language structure might enhance differential processing.

Psycholinguistic aspects

Psycholinguistic research on bilinguals deals essentially with the relationship between the bilingual's two linguistic codes and several mechanisms involved in language

organisation and processing. The hypotheses in this domain range from postulating the existence of two totally independent mechanisms (one for each language), termed the independence hypothesis, to the interdependence hypothesis, which postulates the existence of a single mechanism common to both linguistic codes. In between hypotheses postulate the existence of a compound mechanism which sometimes calls on separate processors and at other times on common mechanisms.

Most research on language processing in bilinguals deals with the issue of organisation, storage and memory of lexical units; a smaller body of research addresses the issue of access.

Co-ordinate versus compound bilinguals and the bilingual's memory.

There appears to be some evidence in support of the compound – co-ordinate distinction, but it must be viewed as distributed along a continuum, varying from one bilingual to another. The bilingual organisation follows a more interdependent pattern in compound than in co-ordinate bilinguals. The degree of interdependence is at least partly a function of language- acquisition and experience. Kroll & Sholl (1992) propose a model, which has a common conceptual store and separate lexicons for L1 and L2 (see Figure 1.1). The strength of the links between lexicons and between any given lexicon and the concepts' store reflects the relative mastery of the languages. This model appears to be upheld by translation and semantic category interference experiments. What it says in effect is that while the model is symmetrical for balanced bilinguals (although some domain specific differences may exist), in the less balanced bilingual access to the concepts' store for the

weaker language will often take place via the dominant language. This model also allows for the balance between languages to be dynamic over time. In this hierarchical model the surface level representations which include tagging and perceptual aspects are stored separately.

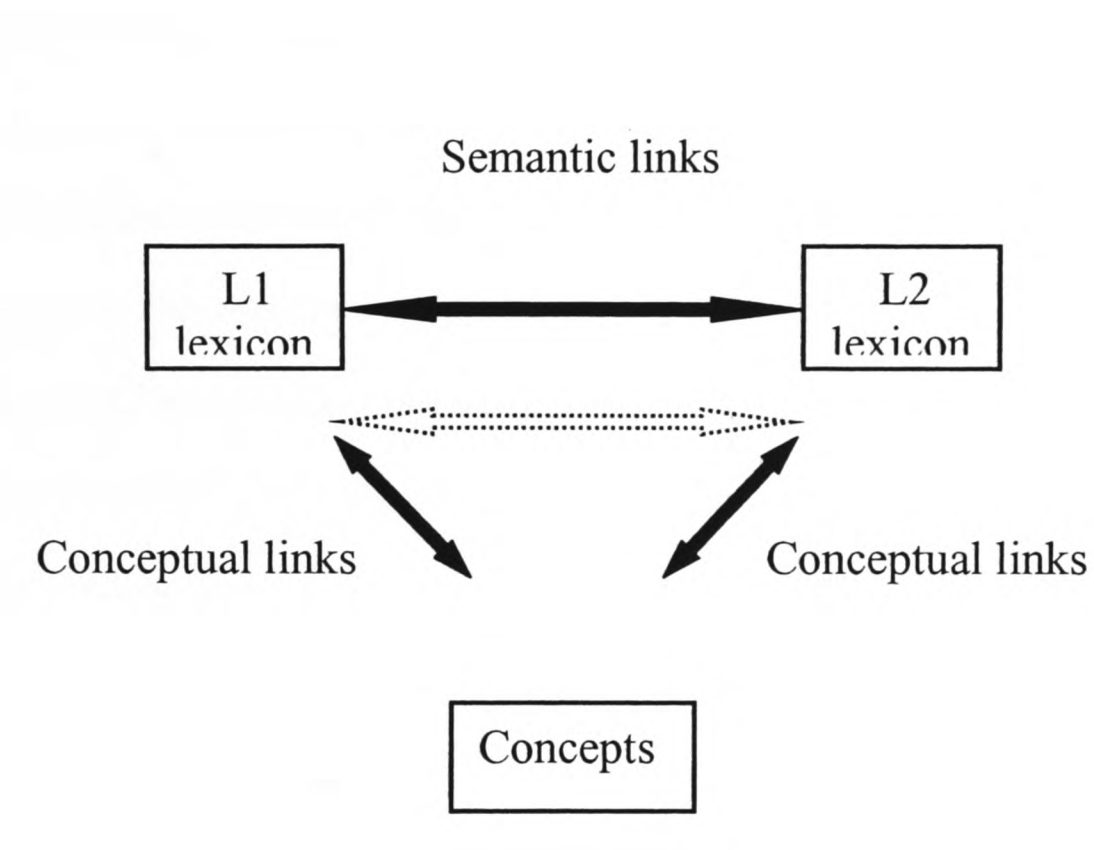


Figure 1.1 Kroll and Sholl’s model

Syntactic processing in bilinguals.

Whereas the vast majority of research on the bilingual's language processing has been conducted at the level of processing of words, there have been a few experiments that address the issue of syntactic processing. Overall it appears that while balanced bilinguals are capable of processing in both languages in the same way as their monolingual counterparts, there are times when they experience language interference. Mack (1986) found that, in a laboratory setting, French-English bilinguals accepted grammatically incorrect English sentences that followed French word order as correct, more often than monolinguals. She concludes that there is no decoding switch mechanism operating, and because the bilingual cannot suppress the automatic activation of one language in rapid on-line processing, he is more likely to use his two languages in active restructuring in either of his languages.

Switches or monitors.

Proof that bilinguals control their language of output, but cannot avoid decoding in both languages comes from a number of experiments. On the other hand, bilinguals must have access to both languages in production as evidenced by code switching. Albert & Obler (1978) propose a continuously operating monitor system that controls the input by continuously testing it for potential correctness. The monitor assigns priorities in interpretation and is prepared to redirect decisions. Even when primed to decode one language, the monitor can still process the other language. At the same time, we have to assume a certain degree of independence between the two languages as evidenced, for

example, by the existence of simultaneous interpreters. Both languages are fully present for input and the monitor uses a number of cues, e.g. contextual or syntactic priming to disambiguate the process and allow the subject to make the right choice of language.

1.3.2 Maturation effects

Hyltenstam & Abrahamson (2000) survey research to-date on maturation constraints in second language acquisition, as well as various theoretical frameworks. They find that there are three main kinds of empirical observations of the relationship between AO (age of onset, defined as age of start of active use) and native-like ultimate attainment in a second language:

Learners attain monolingual-like proficiency only if AOs are earlier than a certain age; after that age, monolingual-like levels are no longer observed;

Monolingual-like levels of L2 proficiency are observed for learners of any AO, although early learners generally attain higher proficiency than late learners;

Early learners attain higher proficiency than late learners, but no learners, not even very early starters, ever attain completely monolingual-like L2 proficiency. There is some indication that this is so even for the age of 6 to 12 months, at least in the domain of phonetics. (No data on simultaneous bilinguals, exposed equally from birth to both languages, appears to have been analysed, but this is after all a survey on L2 acquisition)

For each of these empirical observations both maturational and non-maturational interpretations are possible. The maturational interpretations relate to cognitive, physiological and psycholinguistic aspects. The non-maturational ones include factors such as motivation and a talent for languages.

The authors propose that no L2 learner ever attains completely monolingual-like L2 proficiency, although some appear to do so and would exhibit variations only identifiable in a very rigorous language study. Maturation can account for the overall decline in learning potential with increasing AO, whereas the variability between exceptionally successful and non-exceptional learners of the same starting age are best accounted for by socio-psychological factors.

Differences between the balanced childhood bilinguals in this study and their respective monolinguals could be interpreted as evidence for the hypothesis proposed above.

1.3.3 UG and acquisition

A lot of work has been carried on in recent years on the acquisition of L1, a child's first language, and the acquisition of L2, a language acquired subsequently to the mother tongue. The relationship between Universal Grammar and its instantiations for L1 and L2 forms one of the main assumptions of the study, namely that bilinguals have separate grammars for their languages, both of which are instantiations of UG.

Universal Grammar (UG) and L1 acquisition

In principle at least two relationships are possible between UG and 'core grammars.' In the first, as parameters are determined during L1 acquisition, UG itself becomes the core grammar, i.e. parameter setting changes UG. In the second, UG and core grammars are distinct but related constructs. Under this view, UG could be conceived as the

cognitive model, which constrains grammar construction during acquisition, but remains unchanged during the process. Parameter setting consists of incorporating into each stage of the grammar the particular UG option that is in accord with the primary language data to which the child is exposed.

Evidence for the latter view comes from bilingual child language acquisition. For example, a child learning both English and Japanese simultaneously would be faced with setting a parameter for head direction in two opposite ways. (English is headfirst, e.g. the preposition precedes the noun, Japanese head-last, e.g. the preposition follows the noun). For example:

English (head-first) in Japan

Japanese (head-last) Nippon ni = Japan in

There is clear evidence the child accomplishes this, which would not be possible were one to assume that UG becomes the core grammar while continuing to be an independent cognitive module (there would be no way of catering for the second setting of the parameter).

It appears, therefore, that at least for first language acquisition (including simultaneous acquisition of more than one language), core grammars incorporating set parameters are created side by side with the UG module that is not affected.

There are a number of studies relating to the bilingual child's simultaneous acquisition of his two languages (Romaine 1995). They fall into a number of categories reflecting the many modes of simultaneous acquisition, e.g. one-person one language, one environment one language, both languages used by one parent, one only by another, etc. The studies have by and large been carried out under different conditions and their results are hard to compare. There appears to be a great deal of variation in the amount of cross-linguistic influence reported at various stages, depending on the child's acquisition pattern. This also appears to be the case for different levels of language studied, e.g. there seems to be less influence at phonological level and vocabulary appears to become distinct before syntax.

Opinion is divided between what has been called the 'one system or two system' theory. Some researchers (Swain, 1972; Volterra & Taeschner, 1978) maintain that the child has only one set of rules and one lexical system in the early stage and that, at different stages in the development process and depending on various social circumstances, e.g. amount of mixing in the input, various components of the child's linguistic system separate. The existence of an early undifferentiated stage has been questioned by several researchers, e.g. Genesee, 1989; Meisel, 1994), who maintain that differentiation between the two systems is established at a much earlier age and that the child is capable of keeping the two phonological systems separate as soon as these develop. It is likely that the reality is more complex and it must be assumed that at some level of processing the two systems are connected at least at the conceptual level; whereas the child is perfectly aware of the

existence of two systems, used according to the speaker's linguistic characteristics, he is also aware at an early age that two verbal labels can apply to the same object.

UG and L2 acquisition

Three hypotheses have been formulated with respect to adult L2 acquisition, all of which purport to account for the differences observed in child/adult acquisition of L2 in different ways:

The first hypothesis assumes no access to UG - child L1 and adult L2 acquisition are fundamentally different cognitive processes, the former deriving from the language faculty, the latter determined by non-linguistic processes. Bley-Vroman (1989), for example, suggest that L2 learning strategies derive from Piaget's Formal Operating Principles, including the capacity for 'distributional analysis, analogy, hypothesis formulation and testing.'

It has alternatively been proposed that UG is partially accessible - UG availability is limited to the L2 learner in very specific ways. One representative version of this hypothesis claims that only L1-instantiated principles and parameter values are accessible to the learner. In the case in which L1 and L2 parameters vary, the L2 learner is deemed incapable of assigning a new value to this parameter to correspond with the target grammar. If a particular value of a parameter is realised for L2 but not for the learner's L1, the learner is deemed incapable of acquiring it. Support for this hypothesis comes from studies like that documented by Smith & Tsimpli (1995), in which the subject, an

idiot savant, exhibits an astonishing ability to learn languages, exhibits syntactical competence in English, and treats all his other languages syntax-wise like English. The third hypothesis assumes full access to UG - UG is fully accessible to the L2 learner who creates an L2 specific core grammar. This hypothesis does not deny the difference between L1 and L2 acquisition, but attributes it instead to, for example, differences in the way children and adults acquire the lexicon and integrate UG with grammar-external performance systems.

Proponents of the first two positions often appeal to Lenneberg's Critical Period Hypothesis (CPH). This hypothesis states that there is a progressive lateralisation of the language function to the left hemisphere, a process which is complete by puberty, and that this is responsible for an increase in language learning difficulty with age. Subsequent research, e.g. Krashen (1973) suggests that lateralisation is completed by the age of 5. Modern researchers investigating the link between behaviour and brain maturation tend to speak of 'sensitive' rather than 'critical' periods. It may well be that the acquisition of certain aspects of grammar, e.g. phonemes, is age-sensitive. What many researchers appear to ignore is, however, the fact that CPH refers to the ultimate attainment by the L2 learner of monolingual-like competence rather than speed, or ease of learning (Hyltenstam & Abrahamson, 2000).

Thomas (1991) carries out an experiment which appears to demonstrate that in the binding domain L2 learners have full access to UG (see 2.5.5). Similarly Epstein, Flynn and Martohardjono (1995) argue that only the full access hypothesis exhibits the

explanatory power needed to account for L2 learners' knowledge of language. Their results are consistent with a theory claiming that UG principles and parameters are available to the L2 learner (adult or child) and that 'language development' is restricted to language-particular lexical, morphological and phonological acquisition, parameter setting and the integration of acquired linguistic knowledge with what are, strictly speaking, grammar-external systems.

As a side effect of the above, there may be a sensitive period during which certain aspects of language (e.g. phonology) are acquired more easily, but there is no critical period for language acquisition. Note however that full access to UG does not guarantee that an L2 learner will end up with a grammar identical to the native speaker, as other factors such as quantity and quality of input are bound to play a role in the final language attainment level.

There are not many studies comparing adult and child acquisition of L2. An example of a study which has done so, is a study by Epstein, Flynn and Martohardjono (1995), comparing Japanese speaking children aged 6 to 10 to Japanese learning adults all learning ESL. The subjects were tested on a wide range of complex syntactical factors involving functional categories, specifically IP and CP. The results were analysed statistically (using a multifactored analysis of variance, ANOVA) and showed no significant differences between the child and adult L2 learners for any of the factors tested. When the groups were matched for ESL proficiency level, the results also suggested that the children did not find the task easier than adults did.

The present study used early bilinguals who acquired both their languages prior to the ‘sensitive’ period, set by many researchers at puberty. The result of acquiring two languages L1 fashion could be a fused grammar that uses elements from both languages or two separate grammars. The present experiment assumes the latter to be the case. Given, however, that grammar is influenced by the environment and the exposure to data, one could postulate that exposure to two languages affects the grammatical development, even if the child is able to distinguish between the languages from a very early age. As a result a bilingual could end up with two separate grammars, similar but not identical to the appropriate monolingual. This study starts off by assuming no difference between the grammars of a Japanese/English bilingual and those of an Anglophone or a Japanese monolingual.

1.4 Summary

As seen above, bilingualism has associated with it a number of issues, some of which will be touched upon by the present experiments.

1.4.1 Two or one and the role of UG

Does a bilingual have two separate sets of rules for his two languages?

If so are they identical to the rules employed by the monolinguals? (Is monolingual-like attainment possible?)

What is the role of UG in the acquisition of the two languages?

Evidence from previous research seems to indicate that bilinguals have two sets of rules, similar but not identical to the monolinguals. This will be the main focus of our experiments, albeit concentrating on a restricted domain of syntax. If this indeed turns out to be the case, it will indicate a lack of monolingual-like attainment, although not its impossibility.

Many researchers now postulate access to UG even for second language acquisition. While it would make sense to assume that this will be the case for bilinguals for both their languages, there is nothing in the experiments which will prove the issue one way or another.

1.4.2 Multidimensionality

Bilingualism may be measured along many dimensions. Its dimensions include age of acquisition, relative competence and the socio-cultural status of the two languages. The experiments are set up to avoid these issues by choosing as homogenous a group of bilinguals as possible, all of whom would have started using both their languages by the age of 6, who are considered fully balanced bilinguals by their teachers in the bilingual schools they attend and who speak two languages which are both highly regarded, English and Japanese.

1.4.3 Cognitive aspects

Is bilingualism an asset or a drawback? Some differences of opinion in the matter appear to be linked to the distinction between additive and subtractive bilingualism, the result

largely of language status and subsequent teaching. In the case of additive bilingualism bilinguals exhibit clear cognitive advantages over the monolinguals.

The present experiments are not designed to tackle this issue. All the subjects exhibit additive bilingualism.

1.4.4 Neuropsychological aspects

The linguistic evidence suggests that there may be differences in language hemispheric processing and cerebral lateralisation between monolinguals and bilinguals. There is currently no agreement on this in the relevant scientific circles and it is not a topic addressed in the current study.

1.4.5 Psycholinguistic aspects

Is there a compound/co-ordinate distinction, how does syntactic processing take place in bilinguals, are there switches and/or monitors for input and output processing?

Some studies indicate that there is a compound/co-ordinate distinction between simultaneous and consecutive bilinguals. Roughly half the bilinguals involved in this study started life with two languages. The distribution of the individuals between the four subgroups (given by the language of the questionnaire and the priming text) does not allow a thorough comparison between the two types of bilinguals.

There have been few experiments that address the issue of syntactic processing by bilinguals. It appears that while balanced bilinguals are capable of processing in both languages, at times they are subject to language interference. There appears to be an output switch (as demonstrated by code-switching) and ongoing monitoring of the input for both languages. Cross-language interference in our experiment would tend to confirm the existence of the latter.

1.4.6 Hypotheses arising from studies in bilingualism and L2 acquisition

This subsection lists the assumptions and hypotheses relevant to the main experiment.

Assumptions:

- The judgement of the school teachers on which the selection of the balanced bilinguals was made was reasonably accurate
- English and Japanese have equal societal status in the relevant communities
- Some of the subjects were simultaneous, others consecutive childhood bilinguals. There may well be a statistically significant difference between the brain organisation in the language area between them. While this is manifest in satiation, speed of retrieval and mixing tests, it is assumed that it has no impact on competence.
- It is assumed that basic language acquisition and production are the same across a healthy bilingual population. In particular, the existence of a common semantic store for the two languages and of a mechanism to keep the languages separate is assumed.
- The set (s) of rules bilinguals have are instantiations of UG.
- An input monitoring switch is in continuous operation.

Hypotheses:

- Bilinguals have two sets of rules for their languages. These sets of rules result in judgements which are statistically identical to those of the respective monolinguals and exhibit no cross-language influence.
- Inconsistencies (monolinguals not agreeing with each other) as well as some self-inconsistencies (individuals giving some widely disparate responses on repeat tests) are expected in the monolingual groups.

2. Background assumptions relating to syntax

This chapter looks at the place of syntax in linguistics, examines some of the major recent theories and chooses one as the basis for the experiment. Within the framework of the chosen theory, anaphora in English and Japanese are first examined separately, then compared and the basis for the questionnaires set. A number of relevant case studies are summarised towards the end of the chapter.

2.1 Some recent syntactic theories

Linguistics is the study of language universals (the range and type of properties shared in some way by all languages) and the study of language variation (the range and type of variation possible between languages). Universal Grammar is the innate knowledge of language shared by normal human beings; it includes both the universal properties of language and the variation tolerated among specific languages.

Linguistics has four major subdisciplines:

Phonology - the study of how sounds combine to make morphemes and words, e.g. *in-active*, but *im-polite* not *in-polite*.

Morphology – the study of how morphemes combine to make words, e.g. *act-ive*, *in-act-ive*, but ‘*not acting*’ not *in-act-ing*.

Syntax – the study of how words combine to make sentences, e.g. *I saw the dog* is good English, *I saw dog the* is not. Syntactic theory must account for the common syntactic properties of all languages and how the syntactic properties of languages can vary.

Semantics – the study of how meaning of subparts combine to make the meaning of the whole.

People who know a language are able to produce and recognise a huge number of intricately structured expressions. Moreover they are able to distinguish those expressions which belong to a particular language from very similar ones which do not. Linguists have assumed that these abilities are accounted for by a mechanism called grammar. They are thus faced with two related problems: to ensure that the grammar of a given language is able to encompass all the expressions that can be reasonably assumed to belong to it and to distinguish them from those that don't.

The problem can be compared with that of a fisherman trying to catch in his net all the fish of a certain type in a certain area and no others. But it may not be possible to construct such a net. In this case one would need a separator to remove the undesirables. An ideal separator would remove all undesirables, in which case one might be content with a net which catches everything in the area, leaving the job of removing the undesirables entirely to the separator.

The ideal net corresponds to the original idea of a generative grammar (as in Chomsky 1957), which generates all and only all the expressions of a given language, with no auxiliary devices to remove ungrammatical expressions. Because of the enormous complexity of the resulting grammar many linguists choose to drop the only all proviso (allowing the grammar to over-generate), and to add devices called filters to eliminate the

generated ungrammatical expressions. (see for example Chomsky and Lasnik 1977). The resulting theory ends up with a net and a separator, a situation viewed as unsatisfactory. Chomsky (1995b) states this view as follows: ‘The worst possible case is that devices of both types are required: both computational (generative) processes that map symbolic representations to others and output conditions (filters).

Chomsky’s Minimalist Program represents a return to the idea of the ideal net. Optimality Theory, introduced in the 1990’s, opts for the opposite end of the spectrum, a very simple generative mechanism (GEN) that allows ungrammatical expressions to be created essentially without restrictions, leaving all the work of separating out the ungrammatical ones to filtering devices (EVAL).

Note that the viability of the experiment is not affected by the particular theory of anaphora assumed, as a comparison is being undertaken between the behaviour of balanced bilinguals and monolinguals. The interpretation of the results will however be discussed in this regard in Chapter 5.

2.1.1 Syntax in Principles and Parameters Theory (P&P)

In P&P the common syntactic properties of all languages are expressed as principles. Principles cannot be violated, but they are not absolute either; many contain a universal portion and an open parameter, which may take different values in different languages. An example would be the XP principle used in the X-bar theory governing the universal properties of phrase structure:

XP Principle: a lexical category X and its complement form a constituent XP.

This principle is accompanied by a parameter called the head parameter:

Head Parameter - X occurs initially in XP (as for English or the Romance languages)

X occurs finally in XP (as for Japanese)

Most of the supposedly inviolable principles in P&P remain so only by dint of hedges that take care of exceptions, while increasing the complexity of the grammar. For example, the Extended Projection Principle states that 'all clauses must have a subject'. To this a hedge is added 'except for languages which lack overt expletives'.

The Minimalist Program (MP) removes as many stipulations from the parameters as possible. The only types of parameters that are allowed are those that involve grammatical features, such as Case, Agreement and Tense. Chomsky (1995b) proposes that there is a universal principle that features have to be checked. In order for this to happen, the phrase bearing them must occupy a specifier position that always precedes the head. Chomsky assumes that the complement always starts out following the head so it must move to a specifier position in order for its Case features to be checked. Finally, he proposes that languages differ only in whether such features are strong, resulting in overt movement, or weak, in which case no overt movement is involved. In MP the XP Principle above would be restated in conjunction with a second principle Satisfy:

XP Principle: a lexical category X and its complement and specifiers form a constituent XP

Satisfy: strong morpho-syntactic features must be checked overtly in a specifier position; weak features must be checked covertly in a specifier position.

Parameter: Case features are {strong, weak}

In any theory of language there must be a lexicon (the inventory of words and their properties) and a computational component (a statement of the ways in which sentences can be constructed from those words). In MP the input is described as a group of words, which is mapped to the output by the structure building operations of Merge and Move. These operations are constrained by principles of the sort mentioned above and by principles of economy, which mandate that derivations using these operations must make use of the smallest number of steps possible.

MP has not yet taken a stand on how the Binding Theory is to be implemented. In other words it is not clear which, if any, features are going to be involved. Chomsky sometimes claims that BT should not really be syntax at all, but should be relegated to interpretive mechanisms at LF.

2.1.2 Optimality Theory (OT)

OT originated in the 1990's, largely in response to the complications encountered in using P&P in phonology. Work on syntax within OT is far less advanced and opinions vary between complete unsuitability (Pesetsky 1998), to applicability only in areas where syntax and phonetics border on each other (Pesetsky 1998), to complete applicability (Speas 1998).

Speas (1998) presents a model which, while using OT terminology, is in many ways similar to MP. This allows her to focus on whether syntax contains inviolable principles or violable ranked constraints. Speas assumes the input to be an ordered string of words, with any ordering possible. GEN creates all possible candidate outputs from the input, playing a similar role to Move and Merge in MP. If all languages obey the X-bar principles, then we can incorporate these principles as a restriction on GEN. GEN yields a series of candidates, which are evaluated for optimality by the function EVAL. An important property of OT is that a candidate set always has at least one optimal candidate. However, it is possible in some cases for the optimal candidate to be the null parse, i.e. the candidate that includes none of the input words in the output.

Speas examines the prevalent P&P principles and their hedges and proposes that the principles are far from inviolable. She then applies the OT approach to null pronouns and proposes three violable constraints:

Control: a null pronoun must be controlled in its control domain

Free pronoun: a pronoun must be free in its governing category

MAX(Pro): if Pro occurs in the input, then its output correspondent is Pro (the faithfulness constraint)

The ranking of these violable constraints varies between languages and give rise to the observable language differences.

Burzio (1998) reiterates his arguments for the existence of several hierarchies controlling the behaviour of anaphoric elements. As far as he is concerned hierarchies and soft constraints are just the same thing, yielding a direct translation of those earlier analyses into OT terms. Burzio argues that the OT analysis of anaphora in terms of these hierarchies has virtues of both empirical accuracy and cross-linguistic generality, which are beyond the reach of any theory based on inviolable constraints.

2.1.3 Statistical Approaches

In the early 1970's Suppes (1972) published a paper, the central thesis of which is that objective probabilistic criteria of a standard scientific sort may be used to select a grammar out of a number of possible grammars. According to Suppes one objective of a probabilistic grammar is to account for a high percentage of the corpus with a relatively simple grammar and to isolate the deviant cases that need additional analysis and explanation. Another feature of probabilistic grammars worth noting is that such a grammar can permit the generation of grammatical types that do not occur in a given corpus. This allows the finite corpus to be used as a sample to infer parameter values for a larger, potentially infinite 'population' in the standard probabilistic fashion. Thus, while it is highly unlikely that any corpus will contain Chomsky's 'Colourless green ideas sleep furiously' example, even a simple, suitably constrained statistical model can be set up which will show a very high probability ratio for this sentence (2×10^5), as compared to its ungrammatical variant 'Furiously sleep ideas green colourless'. In his paper Suppes defines the framework within which empirical investigations of probabilistic grammars can take place and attempts to model the speech of a very young child as well as a first

grade primer using this framework. From these examples he concludes that indeed a probabilistic criterion can be imposed as an additional objective or behavioural constraint on the acceptability of a grammar.

Pereira (2000) in his speech to the Royal Society takes up the subject of two seemingly irreconcilable traditions: formal linguistics in the Chomsky tradition as against information theory in the Shannon tradition. He notes that Harris (1951, 1991) had advocated a close alliance between grammatical and information-theoretic principles in the analysis of natural language. Nevertheless, in most research on language and computation, these approaches have moved apart from each other.

Today, after many years on the defensive, the information-theoretic approach has gained new strength and achieved practical successes in speech recognition, information retrieval, and, increasingly, in language analysis and machine translation. While the exponential increase in the speed and storage capacity of computers is a significant factor in this success, Pereira argues that information-theoretic and computational ideas are also playing an increasing role in the scientific understanding of language. While much remains to be done, Pereira concludes that we may well be seeing the beginning of a new version of the Harris program, in which computational models constrained by grammatical considerations define broad classes of possible grammars, and information-theoretic principles specify how those models are fitted to actual linguistic data.

2.1.4 Choosing an Approach

The approach used for a lot of work on anaphora whether in English or in Japanese is P&P. While far from the perfect approach, there is a lot of literature on the subject, which

can be used as a basis for questionnaires in carrying out data collection in the field.

Additionally the Minimalist Program has not yet taken a stand on anaphora and OT does not appear to add anything to the discussion.

P&P has therefore been used as the basic framework of the study and the rest of the thesis reflects this choice.

2.2 The P&P Syntactic Framework

Binding theory, one of the main modules of UG, is the module of grammar regulating NP interpretations in sentences like the following:

- (1) ‘*Martin likes him.*’
- (2) ‘*The girl hurt herself.*’
- (3) ‘*Ryan said that he felt embarrassed.*’
- (4) ‘*Ryan expected him to be more confident.*’
- (5) ‘*He expected Ryan to be more confident.*’
- (6) ‘*He said that Ryan had been more confident of late.*’

Three types of NP are distinguished: full noun phrases such as *Martin, the girl, Ryan*; pronouns such as *he, him*; and reflexive elements such as *herself*.

A full nominal expression (or noun phrase) selects a referent from the universe of discourse, the things we know and talk about. The use of the full NP indicates that there is, or is thought to be, an entity that is identifiable by the NP. Such an NP is referred to as a referential expression.

Pronouns, on the other hand, based on restricting features such as gender and number, select a subgroup from the wider domain of entities under consideration. It is not possible to choose freely any entity of the appropriate gender and number as the referent for a pronoun in a given sentence, e.g. *he* could not arbitrarily be said to refer to *Martin*, the choice of the referent will have to take into account the context outside the given sentence. On the other hand, the fact that *Martin* and *him* cannot be co-referenced in the first sentence, is not a function of context.

While pronouns can refer to entities outside the sentence they are in, reflexives, by and large, cannot, e.g. *herself* in the second example can only refer to *the girl*.

These examples demonstrate that there are principles of grammar regulating the interpretation of NPs. The Binding theory provides an explicit formulation of the grammatical constraints on the NPs in the guise of three principles: Principle A, which deals with reflexives and reciprocals; Principle B, which deals with pronouns; and Principle C, which deals with referential expressions (R-expressions). Binding refers to the binding of the relevant NP by its antecedent, e.g. in

(7) *Poirot_i invited himself_i.*

Poirot_i would be the antecedent of *himself_i* and bind it.

Chomsky proposes that reflexives and reciprocals, pronouns and R-expressions are specified by features +/- Anaphor and +/- Pronominal.

The three principles governing the binding theory can then be expressed as follows:

Principle A:

An NP with the features [+Anaphor, -Pronominal] must be bound in its governing category (GC).

Reflexives and reciprocals belong to this class of NP.

Principle B

An NP with the features [-Anaphor, +Pronominal] must be free in its governing category.

Pronouns belong to this class of NP.

Principle C

An NP with the features [-Anaphor, -Pronominal] must be free everywhere.

R - expressions belong to this class of NP.

The governing category defines the domain in which pronouns must be free and reflexives and reciprocals must be bound, where binding is defined as below. ‘A’ refers to the antecedent, ‘B’ to the reflexive, reciprocal or pronoun.

Binding

A binds B if and only if

- (i) A c-commands B;
- (ii) A and B are co-indexed.

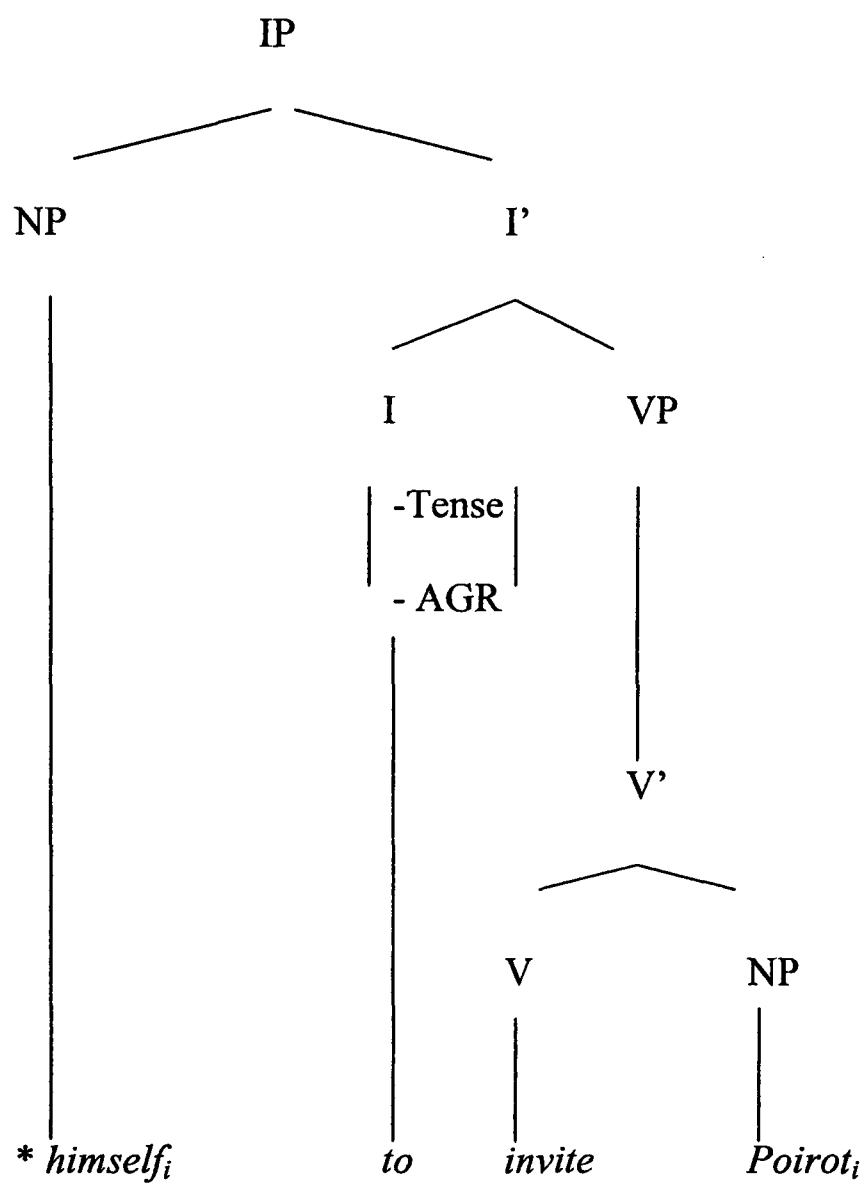
C-command

A node A c-commands a node B if and only if

- (i) A does not dominate B;
- (ii) B does not dominate A;
- (iii) the first branching node dominating A also dominates B.

The following examples are from Haegeman (1995)

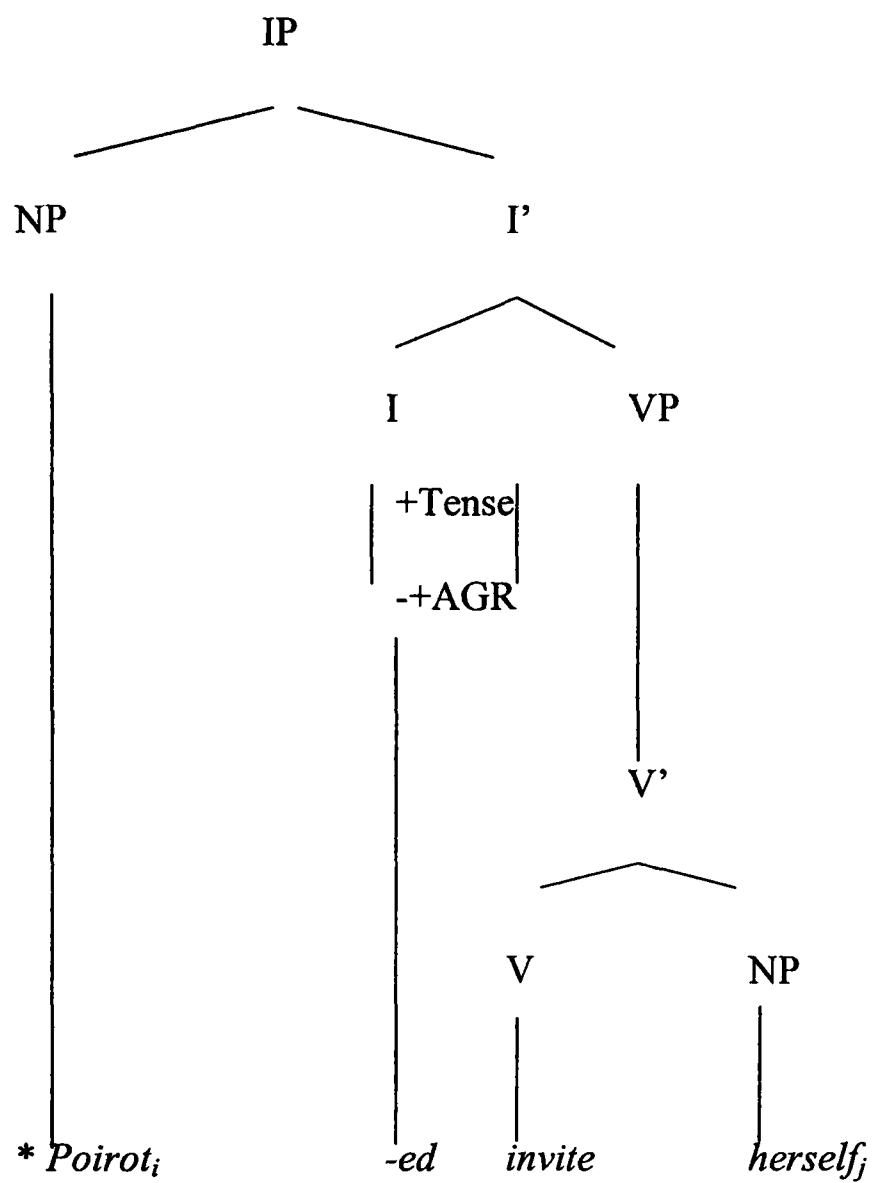
- (8) * *I expect [_{IP} himself_i to invite Poirot_i].*



In this example, as can be seen from the tree, the antecedent Poirot does not c-command the reflexive and therefore cannot bind it. The sentence is ungrammatical.

(9) **Poirot_i invited herself_j*

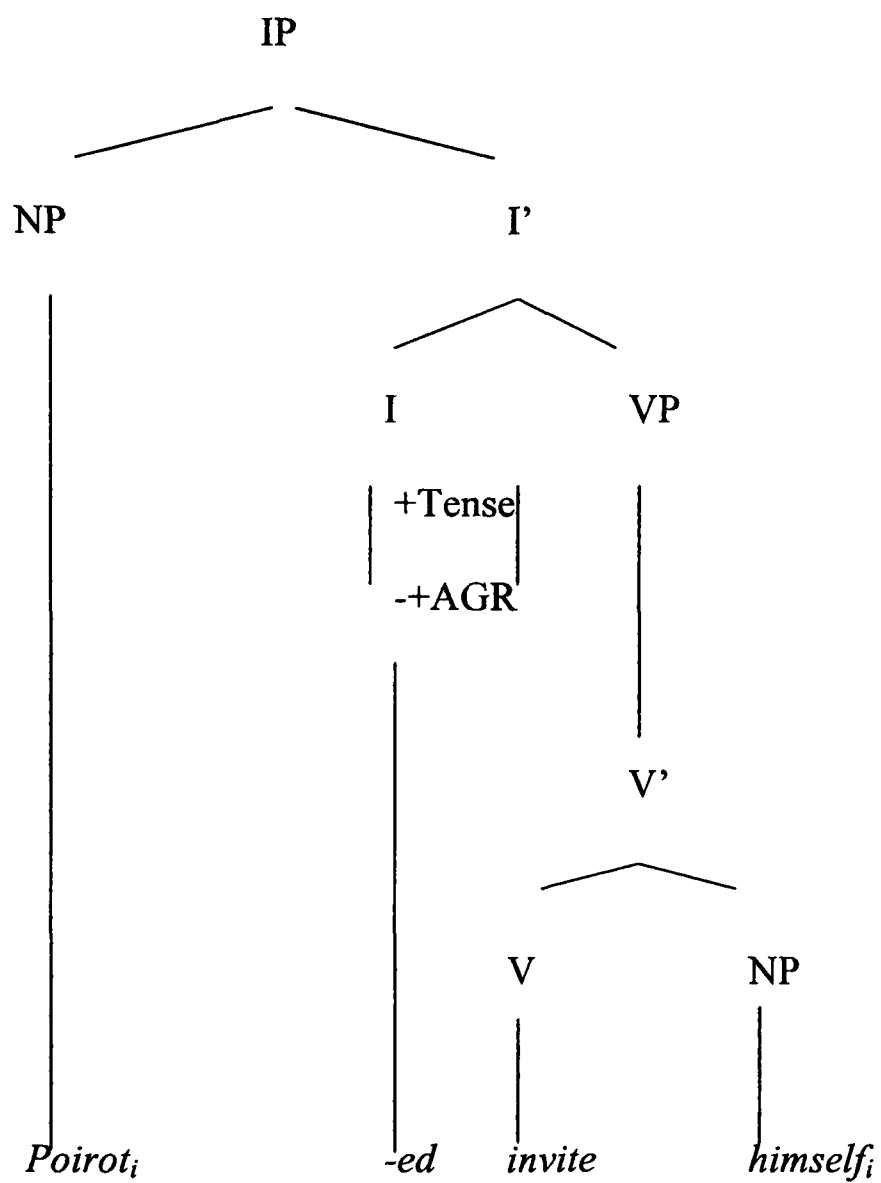
In this example the antecedent *Poirot* c-commands the reflexive but is not coindexed with it. The sentence is ungrammatical.



(10) *Poirot_i invited herself_i.*

In this example the antecedent *Poirot* is co-indexed with the reflexive and c-commands it.

The sentence is grammatical.



The domain in which reflexives and reciprocals must be bound and pronouns must be free is defined as the governing category for the reflexive, reciprocal or pronoun in question.

Governing category

The governing category for A (where A is a reflexive, a reciprocal or a pronoun) is the minimal domain containing it, its governor and an accessible subject/SUBJECT.

m-command

A node A m-commands a node B if and only if

- (i) A does not dominate B;
- (ii) B does not dominate A;
- (iii) the first maximal projection dominating A also dominates B.

Government

A governs B if and only if

- (i) A is a governor;
- (ii) A m-commands B;
- (iii) no barrier intervenes between A and B;

where

- (a) governors are the lexical heads and tensed I;
- (b) maximal projections are barriers.

(11) $[_{CP} Who_i did [_{IP} John [_{VP} invite t_i]]?$

VP in the sentence above is a barrier and IP becomes one by inheritance. The sentence is ungrammatical.

Subject/SUBJECT

- (i) Subject: NP in [Spec, XP].
- (ii) SUBJECT corresponds to finite AGR.

Accessible subject/SUBJECT

A is an accessible subject/SUBJECT for B if the co-indexation of A and B does not violate any grammatical principles.

The contrast in acceptability between the following two sentences reflects the role the subject, in this case *Miss Marple*, plays in delimiting the binding domain.

- (12) **Poirot_i believes [_{IP} Miss Marple to like himself_i too much].*
- (13) *Poirot_i believes [_{IP} Miss Marple to like herself_i too much].*

The binding domain for the reflexive is determined by finding its governor and its closest subject. The smallest NP or IP containing these two elements will be the binding domain in which the reflexive must be bound. The governor is *like*. The nearest subject to the reflexive is *Miss Marple*, the subject of the lower IP. In the first example, the subject and the reflexive cannot be indexed as they exhibit different genders, therefore the subject is not an accessible subject. In the second they can and the resulting sentence is grammatical.

As it stands, this framework postulates complementarity between anaphora and pronouns.

This is, however, known not to be fully the case.

For the purpose of the project, basic binding theory as summarised above, from Haegeman (1995), will be assumed to hold.

2.3 Anaphora in Japanese

In Japanese there are a number of reflexives, the most commonly used being *jibun*. The approaches to *jibun* analysis have varied from purely syntactic to purely semantic.

2.3.1 Syntactic approaches

Inoue (1976) summarises the conditions on *jibun*-binding as follows:

only higher animate nouns can be reflexivised

jibun is used regardless of person, gender and number

the antecedent must be the subject of a sentence (the subject-antecedent condition)

the antecedent must command the reflexive (the antecedent-command condition)

It has been noted, however, that there are many examples that fulfil neither the subject-antecedent nor the antecedent-command condition. Such examples include causative constructions, passive constructions, psych verb constructions, an NP in the complement of the copula acting as an antecedent, or a complete lack of antecedent in the sentence.

Take the following example from McCawley (1976), a non-subject as the antecedent of *jibun* in a causative construction:

(14) *Hiroshi_i wa Mitiko_j o jibun_{i/j} no heya de benkyosasetta.*

Hiroshi TOP Mitiko ACC self GEN room in study CAUSE_PAST

Hiroshi_i made Mitiko_j study in his_i/her_j room.

The interpretation of *jibun* in the example is ambiguous. Binding is allowed not only to the subject but also to the direct object. This type of counterexample to the subjecthood condition has been explained by assuming that they are underlyingly complex, that is, all possible antecedents are ‘subjects’ at some level and the rule of reflexivisation is optionally applied in each cycle containing the subject.

The ambiguous binding in the indirect passive has been explained on the same lines.

(15) *Taroo_i wa Ziroo_j ni jibun_{i/j} no uchi de nekomareta.*

Taroo TOP Ziroo DAT self GEN house in get-ill-PASS_PAST

Ziroo_j got ill in his_i/j house as far as concerns Taroo_i

In the example of backward reflexivisation below the antecedent neither c-commands *jibun* nor meets the subject-antecedent condition

(16) *Jibun_i ga gan de nakatta koto ga Hiroshi_i o yorokobashita.*

Self NOM cancer be not COMP NOM Hiroshi ACC pleased

That he_i did not have cancer pleased Hiroshi_i.

McCawley (1976) proposes a lexical decomposition of the emotive verb and proposes a deep structure, which accounts for the acceptability of the construction by the subjecthood condition.

These explanations still leave out a number of cases, e.g. binding by the topic, or the NP in the complement of the copula, or the complete lack of antecedent in the sentence:

(17) *Taroo_i wa jibun_i no kobito ga Tokyo e itteshimatta.*

Taroo TOP self GEN lover NOM Tokyo to go PERFECTIVE

As for Taroo_i his_i lover has gone to Tokyo.

(18) *Zibun_i ga sippaisita koto ga Taroo_i no byooki no genin da.*

Self NOM failed COMP NOM Taroo GEN sickness GEN cause COPULA

That he_i failed is the cause of Taroo_i's sickness.

(19) *Hanako_i wa 10-nen-buri de kokyoo ni kaette-kita. Dare mo jibun_i ni*

kizukanakatta.

Hanako TOP 10-year-lapse in homeland to return-came. Anyone even self DAT noticed-not

Hanako_i returned home after a 10-year absence. Nobody noticed her_i.

A number of attempts have been made to formulate the binding of *jibun* in terms of Government and Binding: Saito and Hoji (1983), Katada (1988), Ueda (1984). None of these has been fully successful. *Jibun* appears to behave in part like an anaphor: it is bound in its Governing Category and it can take a clause-mate as an antecedent. However it also behaves as a pronominal in not requiring an antecedent in its Governing Category.

2.3.2 Semantic approaches

The observation that *jibun* can be bound to a non-subject argument has raised a number of interesting questions about the interaction of syntax with semantics and discourse.

(20) *Hiroshi_i wa Mitiko_j o jibun_{i/j} no heya de benkyosasete.*

Hiroshi TOP Mitiko ACC self GEN room in study CAUSE_PAST

Hiroshi_i made Mitiko_j study in his_i/her_j room.

A number of notions, partly overlapping, such as reportive versus non-reportive style, empathy, logophoricity, etc. have been introduced to develop a semantic/discourse account of *jibun*. Like the syntactic approaches these have not proved to be fully satisfactory.

2.3.3 Disjunctive approaches

All these studies of *jibun* binding could be said to adopt a disjunctive approach, either explicitly or implicitly. For example, a syntactic approach would be used to cover subject orientation cases and a different mechanism, e.g. semantic or discourse based assumed for the rest. The disjunctive treatment runs into a number of problems, one of them the occurrence and interpretation of multiple *jibun*'s.

(21) *Taroo_i wa Hanako_j ga jibun no heya de jibun no shigoto o siteita*

Taroo TOP Hanakoo NOM self GEN room in self GEN work ACC was-doing
to itta.

COMP said

Taroo_i said that Hanako_j was doing his_i work in his_i room.

Taroo_i said that Hanako_j was doing her_i work in her_i room.

**Taroo_i said that Hanako_j was doing his_i work in her_j room.*

**Taroo_i said that Hanako_j was doing her_j work in his_i room.*

If indeed two separate mechanisms are at work there is no reason why only the first two interpretations should be licensed. It is possible for example that the subjecthood condition licenses the binding of Hanako to *jibun* in one of the possessive arguments, while the discourse condition, say a logophoric one, licenses the binding of Taroo to *jibun* in the other possessive argument.

2.3.4 Conjunctive approaches

Iida (1996) argues that, while a disjunctive approach may work for other languages e.g. English and Icelandic, it is problematic for Japanese. She proposes instead a conjunctive approach in which a weaker (non-subjecthood) syntactic condition is licensed by a discourse condition. Iida (1996) argues that the syntactic condition should be minimally stated in terms of a constraint on the relationship between *jibun* and its antecedent: *jibun* cannot be bound by an antecedent which is realised in a lower co-argument position than itself. The constraint does not seem to be adequately expressed by tree-configurational definitions of commanding. It is rather captured in terms of o-command, a notion introduced by Pollard and Sag (1994) in the theory of Head-Driven Phrase Structure Grammar (HPSG). O-command is defined in reference to an obliqueness hierarchy among the arguments of a predicate. Possible binding is determined by the SUBCAT list

in which arguments are ranked according to a hierarchy of obliqueness. (The least oblique argument of a verb is its subject and less oblique arguments appear further to the right in the SUBCAT list). O-command is defined as follows:

Let Y and Z be synsem objects with Y referential. Y o-commands Z just in case Y is less oblique than some X which dominates Z. In case X = Z, Y is said to locally o-command Z.

A phrase Y o-commands everything that is, or is contained in a more oblique complement of the same head. Iida states the syntactic constraint for *jibun* as

Jibun may not o-command its antecedent.

For example:

(22) **Jibun_i ga Taroo_i o kurusimeteiru.*

Self NOM Taroo ACC annoy

Self_i annoys Taroo_i.

(23) *Jibun_i no zitu no musuko ga Taroo_i o kurusimeteiru.*

Self GEN real GEN son NOM Taroo ACC annoy

His_i own son annoys Taroo_i.

In the first example, *jibun* o-commands its antecedent and the sentence is judged unacceptable. In the second, the head for the NP containing *jibun* is not the head for the complement *Taroo*; no obliqueness relationship between the two applies.

On the other hand this syntactic constraint does not reflect the unacceptability of the sentence below:

(24) **Jibun_i ga Taroo ni Hanako_i nituite intabyauusita.*

Self NOM Taroo DAT Hanako about interviewed

Self_i interviewed Taroo about Hanako_i.

Iida suggests the conjunctive use of syntactic and discourse conditions. She proposes a notion of deictic perspective as the licensing discourse factor for *jibun*. The antecedent of *jibun* is understood as the perspective chosen by the speaker in describing the situation in question. This appears to explain the multiple *jibun* example, as within a specifiable domain there can be only one perspective, hence only one potential referent at any given time.

This approach restricts ambiguity in some cases but does not eliminate it.

(25) Taroo_i ga Hanako_j ni jibun_{i/j} no nimotsu o okaseta.

Taroo NOM Hanako DAT self GEN luggageACC made-put.

'Taroo_i made Hanako_j put his_i /her_j luggage down.'

(26) Taroo_i ga Hanako_j ni teeburu no migigawa_i ni jibun_{i/?j} no nimotsu o okaseta.

Taroo NOM Hanako DAT table GEN right on self GEN luggageACC made-put.

'Taroo_i made Hanako_j put his_i /?her_j luggage down on his_i right of the table.'

In the first example *jibun* is ambiguous. In the second the perspective taken in describing the given situation affects the binding such that the binding to Taroo is preferred. The use of the deictic perspective appears therefore to allow some ambiguity as in (25) while restricting it at the same time and explaining (21).

2.4 Cross - linguistic variations

The behaviour of anaphors and pronouns exhibits variation across languages.

This section outlines the differences between English and Japanese in the domain of anaphora as documented in the literature. These have been used to set up the linguistic questionnaires that formed part of our experiment. The comparisons of judgements by the monolinguals and their bilingual counterparts should indicate whether the bilinguals have ended up with one set of rules for each of their languages, and if so whether this is any different from the system of a monolingual.

For the purposes of this thesis a syntactic approach with exceptions will be assumed for both Japanese and English. Note that in a sense the actual analysis of English and Japanese anaphora is irrelevant. The purpose of the thesis is to establish whether, in the domain of anaphora, bilinguals do differ statistically in their judgements from monolinguals and if so, how. On the other hand, the results are going to have implications for the theory, and in particular, for how such rules are stored and learned.

The differences captured below are reflected in the questionnaires used to elicit judgements from the participants in the experiments. The relevant questions for English and Japanese are listed after each example. A number followed by 'd' indicates that that question is a very slight variation (e.g. gender change) of the previous question. EQ stands for English question, JQ stands for Japanese question. 'n' preceding EQ or JQ indicates the ordinal number of the question in the English/Japanese questionnaire

respectively. Note that some examples could appear under more than one category, e.g. backward binding and psych verb.

2.4.1 Locality

In English an anaphor must be bound in its GC. (EQ57, EQ48)

(27) *'John_i likes my_j stories about himself_i / myself_j.'*

In Japanese this is not mandatory. (JQ53, JQ58)

(28) *'John_i - ga watashi_j - no jibun_{i/j} - ni kansuru hanashi - o kiniit - ta.'*

John-Nom I - Gen self -Dat about stories-Acc likes

'John_i likes my_j stories about himself_i / myself_j.'

In English the reflexive can be co-indexed with a subject or an object. (EQ5, 16d, EQ9, 23d)

(29) *'John_i talked to Bill_j about himself_{i/j}.'*

In Japanese reflexives show a strong subject orientation. (JQ7, JQ15)

(30) *'John_i - ga Bill_j - ni jibun_i / *_j - no koto - o hanashita.'*

John-Nom Bil-Dat self-Gen matter-Acc talked

John talked to Bill about self's matter

*'John_i talked to Bill_j about himself_i / *_j.'*

A similar phenomenon is illustrated by the picture NP (EQ8, 12d, EQ17)

(31) 'John_i - ga Bill_j - ni jibun_i/*_j - no syasin - o miseta.'

John-Nom Bil-Dat self-Gen picture-Acc showed

John showed Bill a picture of self.

*'John_i showed Bill_j a picture of himself_i/*_j'*

While the English equivalent of the above examples is ambiguous, the Japanese is not.

(Farmer, 1984)

There are however some apparent counter examples to this rule. Passive sentences in Japanese can be divided into direct passives, derived from simple sentences, and indirect passives, derived from complex sentences and exhibiting embedding. Farmer (1984) looks at passives and concludes that direct passive sentences with *jibun* are unambiguous, (JQ11, JQ17)

(32) 'Mary_i - wa Bill_j - ni jibun_i/*_j - no uchi de hon-o yoma-se-rare-ta.'

Mary-Top Bil-Dat self-Gen house in book-Acc read-cause-passive-past

Mary was made by Bill to read the book in self's house.

while indirect ones are usually ambiguous. The ambiguity manifests itself in allowing co-indexing with an object: (JQ12, JQ18)

(33) 'Mary_i - wa Bill_j - ni jibun_i/j - no kazoku-no hanashi bakari sa-re-ta.'

Mary-Top Bil-Dat self-Gen family-Gen talk only do-passive-past

Mary was affected by Bill's talking only about self's family.

Another exception is exhibited by non-agentive causatives, which in addition exhibit mandatory backward reflexivisation and are treated in 2.4.7.

In English a reflexive can't appear in the embedded subject position, in Japanese it can.

(EQ6, EQ24, JQ28, JQ23)

(34) ' *John_i told Bill that himself_{*i/*j} won the game.* '

(35) ' *John_i - ga Bill_j - ni jibun_{i/*j} - ga siai - ni katta - to itta.* '

John-Nom Bill-Dat self-Nom that game-Dat won-COMP said

Contrast this with the use of the personal pronoun in Japanese and English (Kuno 1987).

36) ' *John_i told Bill_j that he_{i/j} won the game.* '

(37) ' *John_i - ga Bill_j - ni kare_{i/j} - ga siai - ni katta - to itta.* '

John-Nom Bill-Dat self-Nom that game-Dat won-COMP said

In English a reflexive can't appear in the possessive position, in Japanese it can.(JQ34)

(38) ' *John_i studied in himself_{*i} room.* '

(39) ' *John_i - ga jibun_i - no heya - de benkyo shimashita.* '

John-Nom self-Gen room-in studied

Japanese, but not English, can exhibit long distance reflexivisation. (No co-indexation with Bill is possible in Japanese as Bill is followed by the Dative preposition) (EQ19, 13d, EQ25, 21d, EQ34, 4d, JQ16, JQ20, JQ10)

(40) ‘*John_i told Bill_j that Peter_k blamed himself_{*i/*j/k}.*’

(41) ‘*John_i - ga Bill_j - ni Peter_k - ga jibun_{i/*j/k} - o semeta - to itta.*’

John-Nom Bill-to Peter-nom self-Acc blamed-COMP said

Contrast this with the use of the pronoun in English, which must be free in its GC. (EQ 11, 29, 15)

(42) ‘*John_i told Bill_j that Peter_k blamed him_{i/j/*k}.*’

Note that unlike *jibun*, *jibun-zisin* exhibits no ambiguity and is bound only within its GC. (JQ24, JQ4, JQ29)

(43) ‘*John_i - ga Bill_j - ni Peter_k - ga jibun - zisin_{*i/*j/*k} - o semeta - to itta.*’

John-Nom Bill-to Peter-nom self-Acc blamed-COMP said

‘Picture NPs’ with local subjects exhibit co-indexing with the local subject in English, but with the sentence subject in Japanese. (EQ27, EQ32, JQ27) Note that the use of double genitive is uncommon in Japanese and even JQ27 is no more than marginally acceptable.

(44) ‘*John_i saw Peter_j’s picture of himself_{*i/j}.*’

(45) 'John_i - ga Peter_j - no jibun_{i/*j} - no syasin - o mimashita.'

John-Nom Peter-Gen self-Gen picture-Acc saw

Contrast this with the use of the pronoun in English; the pronoun must be free in its GC.

(EQ20, 35)

(46) 'John_i saw Peter's_j picture of him_{i/*j}.'

In Japanese the reflexive can be construed as a bound variable at LF. (JQ45) This is not possible in English.

(47) 'Dono dansei_i - mo jibun_i - ga eiyuu-da to omotte-iru.'

Every man- also himself-NOM hero-COP COMP think-PRES

Every man thinks himself is a hero.

2.4.2 Use of personal pronouns

Personal pronouns in English are subject to Principle B, i.e. they cannot be used reflexively.

English {1,2,3, -R} (EQ31, EQ37, EQ28,)

(48) 'John_i talks to Peter_j about him_{*i/*j}.'

A pronoun must be free in its governing category. In the example above the governing category is the whole sentence, therefore *him* cannot be bound by either *John* or *Peter*.

Japanese {1 - R, 2 - R, 3 uR} (JQ26, JQ5)

(49) ‘*John_i - ga Peter_j - ni kare_{i/j} - ni tuite hanashita.*’

John-Nom Peter-Dat he-Dat about spoke.

‘John spoke to Peter about him’

In Japanese the first and second person pronouns can’t be used reflexively, the 3rd can. In order to justify the grammaticality of the above sentence, we have to assume either that the governing category is PP or that *kare* can function as an anaphor. The latter will be assumed.

In English personal pronouns like *he/she* can be construed as bound variables at LF, their Japanese equivalents *kare/kanozyo* can’t.(EQ58, JQ38, JQ22) They can however, like their English counterparts, be co-referenced with a proper name. (EQ52, JQ44, 55)

(50) ‘**Dono zyosei_i - mo kanozyo_i - ga tensai-da to omotte-iru.*’

Every woman-also she-NOM genius-COP COMP think-PRES

‘Every woman_i thinks that she_j is a genius.’

(51) ‘*Mary_i - ga kanozyo_i - ga tensai-da to omotte-iru.*’

Mary-NOM she-NOM genius-COP COMP think-PRES

‘Mary_i thinks that she_i is a genius.’

Some preposed subordinate clause constructions are acceptable in English but not in Japanese (Takami 1987 p 175): (EQ38, JQ35, JQ47)

(52) **Mary_i - ga shiken-ni ochi-ta node, kanozōyō_i - wa totemo zannengat-ta.*

Mary-NOM test-DAT fail-PAST because *she*-TOP very regret-PAST

'Because Mary_i failed the test, she_i was very unhappy.'

2.4.3 Interpretation of elided clauses

There are two types of elided clauses. The first (EQ18, EQ7, EQ30, JQ25, JQ30, JQ8):

(53) *'Peter_i defends himself_i better than Paul.'*

(54) *'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'*

This construction has three possible interpretations in English, but only two in Japanese ('sloppy' and 'object comparison'). Sells, Zaenen & Zec (1987)-

- 'sloppy' better than Paul_j defends Paul

- 'subject comparison' . better than Paul_j defends Peter

- 'object comparison' ... better than Peter defends Paul

The second (EQ22, EQ33, 26d, JQ21, JQ19):

(55) *'Peter defends Mary better than Paul.'*

(56) *'Peter - wa Paul yori Mari - o umaku bengosuru.'*

This construction has two possible interpretations in English ('*subject comparison*' /*object comparison*'), but only one in Japanese ('*object comparison*'):

- '*subject comparison*' ...*better than Paul defends Mary*
- '*object comparison*' ... *better than Peter defends Paul*

2.4.7 With psych verbs

Subject binding

As far as English is concerned, it was noted fairly early on (Postal 1971), that the selectional restrictions on the subject of Fear-verbs and those on the object of Frighten-verbs are essentially the same and, similarly, that the selectional restrictions on the object of Fear-verbs and those on the subject of Frighten-verbs are also essentially the same. Pesetsky (1990) refers to Fear-verbs as Experiencer-Subject (ES) verbs and to Frighten-verbs as Experiencer-Objects (EO) verbs.

The subjects of ES verbs (*fear/hate..*) can bind an anaphor, the subjects of many EO verbs (*depress/frighten..*) cannot (Bouchard 1995). (EQ40, EQ43)

(57) '*They frighten themselves*'

(58) *'*John depresses himself*'

In Japanese these distinctions do not appear to be operational and the following is supposed to be ambiguous. (JQ48, 57)

- (59) *'John_i - wa Mary_j - ga jibun_{ij} - o aisite iru koto - o sitte ita.'*
John- Top Mary-Nom self- Acc loving is thing-Acc knowing was
John knew that Mary loves himself/herself

Backward binding

In the case of EO verbs, the direct object can bind a reflexive inside the subject (Pesetsky 1990): (EQ47, 39d, JQ50; EQ49, 60d, JQ51)

- (60) *'Pictures of himself amused the man.'* (non causative)
(61) *'That book about herself struck Mary as embarrassing.'* (non causative)

The example is much worse if the verb is used non-figuratively. (EQ42, JQ56)

- (62) *'* That book about herself struck Mary on the head.'* (causative and concrete)

Note that there is some speaker variability in the acceptance of the last sentence in both its concrete and non-concrete form.

McCawley (1976) distinguishes between apparent backward reflexivisation, which is supposed to be a result of scrambling and the case of non-agentive causatives for which it is mandatory. In the latter case her contention is that this is an instance of normal forward reflexivisation where the original antecedent, a subject preceding *jibun* and co-

indexed with the object to which the reflexive appears to be co-indexed, has been deleted during transformations. An example of each follows below: (EQ41, JQ37, EQ51, JQ31)
Additional examples are illustrated in JQ49, JQ 52, 59.

- (63) *'Jibun_i - no sukina seinen-o Mitiko_i - wa yatto ryoasin-ni syookai sita.'*

self-Gen loved young man-Acc Mitiko-Top finally parents-to introduced

Mitiko finally introduced the young man whom self loved to her parents

- (64) *'*Mitiko finally introduced the young man whom herself loved to her parents.'*

- (65) *'Jibun_i - ga gan kamo sirenai koto-ga Mitiko_i - o nayam-sase-ta.'*

self-Nom cancer may have that Mitiko-Acc worried-make-past

That self might have cancer worried Mitiko

- (66) *'*That herself might have cancer worried Mitiko.'*

Note that in each case the English equivalent is unacceptable.

2.4.5 No antecedent

In English there are a number of constructions devoid of antecedent, yet grammatical,
e.g.: (EQ45)

(67) *'Take someone like myself...'*

(68) *'People like him(self)...'*

Note that there is some speaker variability regarding the acceptability of the last example.

In Japanese *jibun* can pick out as its antecedent some individual that has been mentioned or assumed in a discourse context. This antecedent does not need to be a subject, as the following example from Tsujimura (1996) indicates: (EQ54, JQ32)

(69) A: *Dareka - ga John - no kawari - ni sono party - ni itta - ndesu - ka.*

Someone-Nom John-Gen in place of that party to went-it is that-Q

Is it that someone went to the party instead of John?

B: *Iie, jibun - ga kita - ndesu.*

No, self-Nom came-it is that

No, it is that self came.

The equivalent English is ungrammatical.

(70) *'*No, it was myself.'*

Japanese imposes some restrictions on this type of construction, requiring that the perspective of the speaker be the same as that in the sentence containing the antecedent.

The out of sentence antecedent is not acceptable. (JQ46, 54)

9710 'John - to Paul_j -wa tomodachi da. John_i - ga jibun_{i/*j} - ga tensai-
John and Paul-TOP friends COP. John-NOM himself- NOM genius-
da to omotte-iru.'

COP COMP think-PRES

John and Paul are friends. John thinks himself is a genius.

2.4.6 Agreement

In English the reflexive agrees with its antecedent in person, gender and number. (EQ56, EQ46)

(72) 'John told Mary things about himself/herself/*myself/*themselves.'

In Japanese *jibun* is used for any person or gender, although the suffix - *tachi* can be optionally added when the antecedent is in the plural. (JQ33, JQ41)

(73) 'Gakusei - ga jibun - tachi - o semeta.'

student-Nom self - pl-Acc blamed

The students blamed themselves.

While in English the antecedent can be inanimate or animate, in Japanese it must be animate. (JQ39, EQ50, JQ43)

(74) *'History repeats itself'*

(75) *'Kodomo - ga jibun - no uchi - e hasitte - itta.'*

child-Nom self-Gen home-to run-went

The child run to self's house.

*'*The child run to himself's house.'*

(76) *'*Jidosha - ga jibun - no syako -no hoo - e hasiridashita.'*

car-Nom self-Gen garage-Gen direction-to began to run

The car began to move to self's garage.

*'*The car began to move to itself's garage.'*

In both cases the English equivalents are unacceptable, as the reflexive can't be used as a possessive adjective.

2.4.17 Modifiers

In English personal pronouns and reflexives allow no modification. In Japanese *jibun* but not *jibun - zisin* as well as personal pronouns e.g. *kare (he)* can take various prenominal modifiers e.g. an adjective, a numeral quantifier or a sentence modifier. (EQ56, EQ44, JQ40)

(77) *'*John found a new himself in the mirror.'*

(78) ‘ *John_i - ga kagami - no naka - ni atarashii jibun_i - o mituketa.* ’

John-Nom mirror-Gen inside-in new self-Acc found

2.4.8 Empathy requirements

Japanese exhibits in addition specific characteristics with the give and take verbs that have a scale of empathy requirements (Kuno 1987). For example, although both *kureta* and *yatta* mean *to give*, one produces an acceptable sentence with *jibun*, the other does not. (JQ42, JQ36)

(79) ‘ *John_i - wa Peter -ga jibun_i - ni kasite kureta hon - o nakusite simatta.* ’

‘ **John_i - wa Peter -ga jibun_i - ni kasite yatta hon - o nakusite simatta.* ’

John-Top Peter-Nom self-to lending gave book-Acc losing ended up

John has lost a book that Peter has lent him.

Note that the English equivalent is ungrammatical:

(80) ‘ **John has lost a book that Peter has lent himself.* ’

2.4.9 pro-drop

In Japanese it is possible to drop the personal pronoun. (JQ60) This is not the case in

English.

(81) 'John - ga tensai-da to omotte-iru.'

John-Nom 'pro' genius-COP COMP think-PRES

John thinks (he) is a genius

2.4.10 Summary

The differences between Japanese and English in summary (according to the literature) are outlined below. The numbers in the English and Japanese columns indicate the item number which will be used to test the condition. A 'd' indicates this is a replicate of another item with some lexical items replaced.

Characteristics of anaphora	English	Japanese
Double genitive allowed	Yes 27,32	Marginal 27
Binding in the governing category mandatory	Yes (57,48)	No (53,58)
long distance reflexives used	No 15,13d, 25,21d,	Yes 16,20,10

	34,4d	
no antecedent constructions acceptable (but of different types)	Yes 45,54	Yes 32,46,54
Modifiable anaphors	No 56,44	Yes 40
gender, person and number agreement with antecedent mandatory	Yes 56,46	No 33,41
the antecedent of the reflexive must be animate	No 50	Yes 39,43
the reflexive can occupy the embedded subject position	No 10,36 51	Yes 14,6 31
the reflexive can occupy the possessive position	No	Yes 34
strong preference for a subject antecedent	No 5,16d,9 ,23d, 8,12d, 17 46	Yes 7,15 9,13 picture np 48,57
Counter example: direct passive unambiguous	N/A	Yes 11,17

indirect passive ambiguous	N/A	Yes 12,18
non-agentive causative + backward binding	N/A 41,51	Yes 37,31
Reflexive can be construed as bound variable at LF	No	Yes 45
Empathy	No	Yes 42,36
Acceptable 'subject comparison' interpretation of elided clauses: 2 ways	Yes 22	No 21
3 ways	7	30
Acceptable 'object comparison' interpretation of elided clauses	Yes	Yes
2 ways	33,26d	19
3 ways	30	8
Acceptable 'sloppy' interpretation of elided clauses	Yes	Yes
3 ways only	18	25
Acceptable use of pronouns as anaphors	No 31,37, 28	Yes 26,5
Personal pronouns construed as bound variable at LF	Yes 58	No 38,22
Personal pronouns co-referenced with proper name	Yes	Yes

	52	44,55
pro drop	No	Yes 60

Table 2.1 Differences between English and Japanese Anaphora as per literature

The differences as per literature between Japanese and English can be summarised in terms of features in the tables below.

Japanese	English
+Nom/+Acc/+Dat/+Gen -person/-gender/-number/+animate -double genitive <i>-double genitive (pronoun, not tested)</i> +modifiers	-Nom/+Acc/+Dat/-Gen +person/+gender/+number/+-animate +double genitive <i>+double genitive (pronoun)</i> -modifiers
Limited discourse referent possibilities (all persons) Empathy(lexical verb choice) No ambiguity/make a choice <i>No ambiguity/make a choice (pronoun)</i>	Very limited discourse referent possibilities (mainly first person) Ambiguity allowed <i>Ambiguity allowed (pronoun)</i>
Bound variable reading possible <i>Bound variable reading possible (pronoun)</i>	Bound variable reading possible(not tested) <i>Bound variable reading not possible (pronoun)</i>

Argument structure sensitivity (Long distance binding possible, in some cases preferred) <i>Argument structure sensitivity (pronoun)</i>	c-command structural sensitivity (long distance binding not possible) <i>c-command structural sensitivity (pronoun)</i>
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Table 2.2 Main features of Japanese and English anaphora

Type	Japanese	English
Maximum of three possible interpretations	+sloppy +subject comparison (strict) -object comparison(split)	+sloppy -subject comparison(split) -object comparison(split)
Maximum of two possible interpretations	+subject comparison -object comparison (split)	+subject comparison +object comparison (split)

Table 2.3 Ellipsis as viewed by Japanese and English respondents

2.5 Relevant Studies

2.5.1 Ultimate attainment

Johnson and Newport (1989)

Johnson and Newport (1989) reported a study of the ultimate attainment of certain language-specific structures by native speakers of Chinese and Korean who had learned

English as their second language. These subjects were chosen because of the typological dissimilarity between Chinese and Korean on the one hand and English on the other, the purpose being to reduce as much as possible any facilitating effects from the first language. The subjects, who were selected from the student and the faculty population of an American University, were divided into four categories according to their age of first exposure to English: 4 to 7 years, 8 to 10, 11 to 15, and 16 and beyond. Anglophone controls were also used. All subjects were presented aurally with 276 utterances, approximately half of which were ungrammatical and which tested 12 language-specific features of English morphology and syntax: plural, third-person singular, present progressive morphology and the syntax of determiners, pronoun case and agreement, particle movement, subcategorisation, auxiliaries, yes/no questions, wh-questions, and word order. Whereas performance for the first group did not differ significantly from the monolingual performance, the performance of the other groups increasingly deviated with increasing age group. A similar experiment carried out by Johnson & Newport (1991) showed, however, that when it came to subjacency judgements all subjects exhibited a non-monolingual like performance. The 4-7 group would fall within the parameters of sequential balanced bilinguals as defined in this thesis.

Native Speaker (NS) versus Near Native Speaker (NNS)

Coppieter's study (1987) compared 20 NS's of a somewhat varied socio-linguistic background, covering various regions of France and Belgium and ranging from linguists to caretakers to a group of NNSs.

The NNS group consisted of 21 people, all of whom had acquired French as adults, i.e. none of whom had been placed in circumstances in which they had had to use the language for normal communicative purposes before the age of 18. The group included 17 professors and two researchers. The number of years spent in France averaged 17:4. The NNSs interviewed considered themselves, and were considered by their colleagues, as no different in French linguistic competence from Francophones. Batteries of official tests would place them at the top of the proficiency scale.

The study used 107 sentences and required the participants to provide well-formedness judgements, in some cases for alternate forms. For the latter, they were also asked whether both forms were acceptable to them and if so what the meaning difference was, if any.

The results of the study show that NNS's answers do not fall within the range of NS's, thereby indicating NNS's grammar differs from NS's. The NS's varied from the norm on between 5% and 16% of the sentences, the NNS's between 23% and 49%. Even the NNS who was closest to the natives was three standard deviations away from the NS mean.

From the results of Coppieter's study, it is clear that NNS's have developed self-consistent grammatical judgements. Take for example the anaphoric uses of *il/elle* versus *ce*. NS's accept one or the other or both, depending on the sentence, and their intuitions seem quite stable (10% variation). The NNS's show much greater variation. In each case,

however, it is clear the speaker has developed a system with which to decide whether the use of *ce* is appropriate, e.g. :

Qui est Victor Hugo? *Il/C' est un grand écrivain du XIXème siècle.

The question asks for the essential, contextually relevant characteristic of Victor Hugo, which would enable the questioner to identify (in some case to pigeonhole) Victor Hugo. *Ce* is the obligatory pronoun in such cases. NNSs tend to consider *il/elle* as more of an animate pronoun and *ce* more of an inanimate pronoun. 13 NNSs preferred or at least accepted *il* in the above example. NNSs also tended to consider *ce* as the more popular, less educated form.

Even when NSs and NNSs agree on the choice of a form, they often offer radically different reasons for the choice of one form over the other. For NSs *une histoire triste* is a story that makes you cry, *une triste histoire* is an embarrassing problem. NNSs accept both forms but, with exceptions, do not differentiate between them. The two who do, use the former before telling the story, the latter after having told it.

Given that the NSs' grammatical judgements do differ from each other and, as such, every person could be said to have developed his or her unique version of grammar, the best way to express the distribution of grammatical judgements could be along a continuum. This continuum can be safely expected to show a cluster for NSs and possibly other clusters for NNSs determined by a combination of their native tongue, conditions of acquisition, socio-linguistic factors, etc. Indeed the data showed a cluster for NS's. There

was insufficient data in the sample used to show statistically meaningful clustering for the NNS's.

Coppieter's study indicates that NNSs grammar is different from that of the monolinguals. In a replication of this study, although using more strict criteria for subject screening, Birdsong (1992) found that 15 of his late foreign language learners of French performed within the same range as native speakers on a difficult grammaticality judgement task, indicating that monolingual-like attainment is possible for late learners in some areas of grammar.

Bilinguals and anaphora

Anaphora interpretation is the cornerstone of Binding Theory. But is the bilingual's interpretation of anaphora identical to that of the monolingual? And what does this indicate about the number and type of bilingual grammars?

To investigate these issues, two sets of experiments were carried out in Montreal using mainly undergraduate students taking linguistic classes. Subjects were divided into three groups: Anglophones, Francophones or French/English bilinguals. Subjects completed, under controlled conditions, a battery of three questionnaires: a socio-linguistic questionnaire, a linguistic questionnaire asking for acceptability judgements of given interpretation of statements containing anaphora, and a linguistic questionnaire asking for acceptability judgements of statements containing anaphora. The linguistic questionnaires for bilinguals could be presented in French or English. Combined with a

priming text (the contents of which had no relevance to the linguistic questionnaires), a bilingual could receive one of four different combinations.

The two sets of experiments used identical socio-linguistic questionnaires and priming texts. The linguistics questionnaires in the first set of experiments required subjects to choose all acceptable interpretations of statements containing anaphora or give a yes/no judgement on the acceptability of given sentences.

The first experiment indicated that for some constructions monolinguals disagreed among themselves and that in most cases the bilinguals followed suit, although there were a number of cases for which the bilinguals' behaviour appeared to be different from that of the monolinguals.

The second experiment used the results of the first to set up a more sophisticated acceptability scoring system (all judgements were made on an acceptability scale of one to six and data was presented in a different manner) and enlarged on the number of constructions under consideration.

The resultant analysis focused on the cases in which there was agreement among the monolinguals. From these results it appears that bilinguals have separate sets of rules for their two languages. These sets of rules are similar but not identical to those of their monolingual counterparts. In some, but not all, cases, the differences can be clearly traced to the influence of the second language. For example French allows for articles

with intrinsically reflexive interpretation of the form *Il a leve les yeux*. The bilingual groups, jointly and separately, are less inclined to accept this sentence than the monolinguals. The English equivalent *He lifted the eyes* is unacceptable. The bilinguals filling the French linguistic questionnaire appear to have been influenced by English.

English and French belong to the same language family and are typologically similar. The question that arises is, do similar effects occur if the languages in question belong to completely different language families? The present study compared the interpretation of anaphora by balanced English/Japanese bilinguals and monolinguals to investigate whether bilinguals end up with different parameter settings from the monolinguals, and, whether they do or not, what other factors may be at play in causing differences in interpretation, if any.

2.5.2 Order of Acquisition

Ritchie & Bhatia (1999) state that bilingual children exhibit the same major stages of acquisition as monolinguals: the babbling stage, followed by the one-word stage, two-word and multiple-word stages. However, researchers are divided over whether monolingual and bilingual acquisition mechanisms are similar in more detailed respects; some argue that linguistic input, analytical maturity, etc. might differentiate monolingual from bilingual acquisition. Furthermore, mixed input, unique to bilingual children, might open up a different path of language development. Researchers are also divided over acquisition theories for monolinguals (see Lust, 1999 and Wexler, 1999 below).

The problem of acquisition requires a system of principles or strategies that implements UG and explains the sequence of grammars (whether adult-like or not) that the learner goes through to arrive eventually at the adult grammar. Researchers appear to be split over how this is accomplished in real-time. Two theories, which contradict each other, have strong support. The first, the continuity theory, states that language acquisition involves immediate switch setting on the basis of the presented data, and that some independent and extrinsic change in cognitive capacities, e.g. memory or attention span, accounts for observed stages of growth. The second, the maturation theory, allows for the possibility that some parameter-switch settings (and the structures that follow from them) are biologically unavailable to the child early in life, and become available later, only after a process of mind/brain maturation has taken place. Each theory has empirical evidence to support it.

Wexler (1999) analyses research results on binding theory, optional infinitives and A-chains in terms of maturation and the minimalist program. He concludes that many features of syntactic structure specific to the language of the child's environment are in place by 2 years of age. Those aspects of structure which are maturationally delayed, appear to share the property of requiring co-ordination between the computational system of the minimalist program (the syntactic component in earlier theories), and the conceptual-interpretative component (the semantics) of the developing grammar.

In opposition to the maturation hypothesis, Lust (1999) proposes a strong continuity hypothesis (SCH) under which UG is fully available to the child throughout the process

of acquisition. Language development is then understood as a process of grammatical mapping from UG to an adult language, through the construction of the grammar for that language, on the basis of input from the environment. Grammatical mapping subsumes a variety of processes, including the integration of modular UG principles, the setting of parameters, the integration of principles and parameters setting, as well as the morphosyntax and semantics of the lexicon of the ambient language. In the case of 'delayed acquisition', she claims that, for some specific cases, the mapping from UG to the grammar requires more time than in others, and refers to empirical results in binding theory, relative clause structure, control and directionality as supporting her case.

Crain & Lillo – Martin (1999) address children's knowledge of constraints by focussing on backwards anaphora. Some previous researchers seemed to think, on the basis of the experiments conducted, that initially at least children do not use Principle C. Instead, these researchers claimed that children use the linear order of words instead of their structure. "Children use direction rather than structural principles in restricting anaphora." (Lust, 1986) Crain & Lillo – Martin refer to an experiment carried out and documented by Crain & McKee, using the Truth – Value Judgement Task. This requires the subjects to judge the truth or falsity of a sentence, according to its fit to the context. Two experimenters run the task. One uses toys and props to act out a situation corresponding to one interpretation of the target sentence. The other manipulates a puppet, Kermit the frog. Following each situation Kermit says what he thought happened in the trial. If he says the right thing, the child feeds Kermit one of his favourite treats, for example a cookie. But sometimes Kermit isn't paying full attention, and ends up saying

the wrong thing. When this happens, the child asks Kermit to eat something “yucky”, e.g. a rag or a cockroach, or to do push-ups, to remind him to pay better attention next time. This method makes it much easier for children to give negative assessments, and it reduces extraneous processing demands that are present in comprehension tasks, in which children are required to act out the events themselves. As a result, the method can be used with children as young as two or three. The findings of this study showed that even children as young as two or three prohibit backwards anaphora only when structural conditions (involving C – command) dictate that they should. These findings imply that any acquisition involved in processing anaphora happens very early on.

Wexler and Chien (1985), showed that children before age 5 knew the c-command aspect of principle A as well as its locality aspect. Principle B, on the other hand, has provided what at first appears to be a different picture. A number of experimenters, including Wexler and Chien (1985), showed quite systematically that, at the very ages at which children displayed excellent knowledge of principle A, they very often failed on what appeared to be tests on Principle B. For example, in their experiments children would roughly in 50% of cases, take *her* to be *Cinderella's sister* rather than *Cinderella* in sentences like the following:

(82) *Cinderella's sister pointed to her.*

This interpretation is ruled out by Principle B.

At first sight, this result might suggest a direct growth/maturational approach to Principle B. Wexler and Chien (1985) suggested instead that the problem that the child had was not one of lack of knowledge of Principle B, but rather a problem with

pragmatic/interpretative knowledge. In other words the child knew Principle B but did not know or could not apply the interpretative principles concerning non-coindexed pronouns. Consider a representation like the following:

(83) a. **Mama Bear_i hugged her_i*

b. *Mama Bear_i hugged her_j*

In a. Mama Bear and her are coindexed. Principle B thus rules out the representation. In b. they are not. Wexler and Chien (1985) pointed out that children who did poorly on a. could know Principle B, but could be using the noncoindexed representation b., thus violating pragmatic/interpretive principles instead. They suggested that a more appropriate test for Principle B would be one in which the semantics ensured that the only possible interpretation of the sentence was the bound, coindexed one. For example, when a pronoun is bound by a quantifier, the only possible grammatical interpretation is one in which the pronoun and the quantifier are coindexed

(84) c. **Every bear_i hugged her_i*

d. *Every bear_i hugged her_j*

The co-indexed representation c. is ruled out by principle B. The second interpretation is not ruled out by Principle B. However, by the principles of interpretation, her is not logically bound by every bear in d.; no matter what the pragmatic situation, the sentence cannot mean that every bear hugged herself.

Wexler and Chien (1985) proposed a crucial experiment: study children's behaviour on a, b, c and d. If they demonstrated excellent behaviour on c. and d., even if not on a. and b., this would demonstrate they knew Principle B and had a problem with

pragmatic/interpretive rules. The set of experiments carried out in 1990, (Wexler and Chien 1990) confirmed that this is the case. For a comprehensive review of the literature on Principle B see Thornton and Wexler (1999).

2.5.3 Issues of Self-consistency

Nagata (1989) carried out a number of experiments, using monolingual speaking Japanese students. His conclusion is that, upon repetition, the judgements for subtly ungrammatical sentences become more stringent, while those for grammatical sentences or for obviously ungrammatical ones remain the same. Nagata examined the effect of repeated presentation of sentences on respondents subjected to the following repetition treatment: after the initial presentation and judgement the sentences were presented 9 times for 3 seconds each, with an inter-stimulus interval of 1 second. The subjects were required to rate the grammaticality of each sentence on the 10th presentation. Nagata measures the stability of the judgements on the basis of the mean value given for a given type of sentence (grammatical, subtly ungrammatical, and obviously ungrammatical). Cowart (1996), working with American students, finds evidence for stability across sentences. His experiment involved presenting the same 12 sentences from a 'that' – trace experiment in which each informant (a total of 52) participated in an experiment repeated at a one-week interval. The filler sentences were identical but their order varied between the two sessions. A strong correlation was found between the responses to the two sessions, leading Cowart to conclude that subjects exhibit stability in their judgements in both high and low acceptability sentences.

2.5.4 Questioning Current Theory

There are some indications that at least some of the P&P theory is in error. The possible interpretation of ellipsis in English is a case in point. According to Sels, Zaenen & Zec (1987), English ellipsis involving the reflexive exhibit three acceptable interpretations: sloppy, strict and object comparison:

(85) ‘*John defends himself better than Peter (defends himself)*’ (‘sloppy’)

John defends himself better than Peter (defends him, John) (‘strict’)

John defends himself better than (he, John defends) Peter (‘object comparison’)

The monolinguals and the bilinguals alike accept the ‘sloppy’ interpretation and reject the other two.

Kennedy & Lidz (2001) review this construction in a paper on a long distance anaphora in English. They claim that the strict interpretation in elided clauses is blocked when the subject of the comparative clause is a name, or a pronoun. They propose that strict readings of reflexives in comparatives involve binding of a long distance anaphor from the subject position of a matrix clause. They explain the apparent absence of such an object in English by claiming that, although the long distance anaphor is a well-formed syntactical object, it has no morphological instantiation, and so can not appear in a PF representation without violating Full Interpretation. Such an object can appear in an elided constituent, however, because deletion of syntactic material in ellipsis bypasses the need for morphological realisation. The pattern of strict readings in comparatives mirrors the pattern of long distance anaphora in Chinese; in particular, the contexts in which strict readings are impossible, are strikingly similar to the environments in which long distance anaphora is blocked. The strict interpretation in the example above would therefore be unacceptable (the ‘object comparison’ is not addressed in the paper).

2.5.5 Availability of UG to second language learners

Thomas (1991) addresses the debate about whether adult language learners have access to the parameters and the principles of UG in constructing the grammar of L2. She investigates the interpretation of English reflexives by native speakers of Japanese and Spanish, and the interpretation of the Japanese reflexive *jibun* by native speakers of English and Chinese. The data suggest that L2 learners observe constraints defined by UG, constraints which they could not have derived solely from inspection of the input data, nor from the treatment of anaphors in their native language. Thus these results support the proposal that adult learners have access to UG.

The subjects were 132 adult learners of English and 41 adult learners of Japanese. They were all studying their respective L2s in L"-speaking environments, but most had had foreign-language teaching in their native countries.

Two experimental tasks were administered. One consisted of elicited imitation of sentences in L2 with pronouns and anaphors in varied syntactic structures. The second task was a multiple-choice comprehension test of the interpretation of pronouns and anaphors in L2. Six sentence types were used for the latter, three each for learners of English and learners of Japanese. Sentences of the type E1, E2 and J1 investigate governing category parameter settings; types E3 and J3 investigate the proper antecedent parameter. In addition, types E1 and E2 test whether linear order is relevant to the

assignment of coreference, and tpe J2 addresses whether learners require c-commanding antecedents for *jibun*.

Type E1: Biclausal; sentential complement

Mary heard that Sue told the doctor about herself.

Sue = Local NP (subordinate clause subject)

Mary = Long-distance NP (matrix clause subject)

Type E2: Biclausal; relative clause

The man who John met wrote a story about himself.

The man = Local NP (matrix clause subject)

John = Long-distance NP (relative clause subject)

Type E3: Single clause; subject vs. nonsubject NPs

Mary told Karen one more story about herself.

Mary = Subject NP

Karen = Nonsubject NP

Type J1: Biclausal; sentential complement

Taro wa Mika ga jibun o aisite iru to omote iru.

Taro top Mika NOM self ACC love is COMP think is

‘Taro thinks that Mika loves self’

Mika = Local NP (subordinate clausesubject)

Taro = Long-distance NP (matrix clause topic)

Type J2: Single clause; c-commanding vs. non c-commanding NP

Mika no imoto ga jibun no mondai nit tsuite hanashta.

Mika GEN sister NOM self GEN problem about spoke

'Mika's sister spoke about self's problem'

Mika no imoto 'Mika's sister' = c-commanding NP

Mika = non c-commanding antecedent

Type J3: Single clause; subject or nonsubject NPs

Yoko wa Haruko o jibun no heya ni suguni tsurete itta.

Yoko TOP Haruko ACC self GEN room OBL soon lead went

'Yoko led Haruko to self's room right away'

Yoko = Subject NP

Haruko = Nonsubject NP

For E1 sentences the results indicate that most L2 learners locally bind reflexives in finite subordinate clauses. A similar thing happens for E2. When the responses for E1 and E2 are pooled learners seem to form hypotheses about the properties of anaphors in L2 in accord with legitimate parameter setting. In single-clause type E3 sentences most L2 learners consistently assign only subject antecedents to reflexives, 52% of the control native group appears to do the same despite pre-training in ambiguity.

Results for J sentences indicate a similar pattern in comparison with the control native group.

In summary, L2 learners seem able to reset parameters in L2; they rarely formulate hypotheses about the referential properties of anaphors which are excluded by UG, and they do not realise in L2 only the version of UG that is present in their native language. These data support the hypothesis that adult language learners have direct access to principles and parameters of UG in their interpretation of anaphora in a second language.

2.6 General assumptions and hypotheses

2.6.1 General assumptions

A number of general assumptions underlie the design and conduct of our experiments (see also Chapter 1).

- There may well be a statistically significant difference between the brain organisation in the language area of simultaneous and consecutive childhood bilinguals. While this is manifest in satiation, speed of retrieval and mixing tests, it is assumed that it has no impact on competence.
- Bilinguals have had access to UG for both their languages.
- The features as per tables 2.2 and 2.3 are a sufficient and complete representation of the English and Japanese anaphoric systems (In reality this is unlikely. It is known for example that in English, while GB rules state that the distribution of pronouns and reflexives is complementary, this is not fully the case. The data collected in the experiment will help to pinpoint questionable places in the theory.).

2.6.2 Hypotheses

The experiment carried out for this thesis had a pilot phase and a main phase. The purpose of the pilot phase was to establish whether there was anything interesting to be seen in comparing English/Japanese bilinguals to monolinguals in the domain of anaphora.

English belongs to the Indo-European family of languages. Japanese is supposed to belong to the Altaic family, however this is in dispute (Harris 1992). Given that Japanese and English belong to totally different language families and are typologically different, the hypothesis put forward was that no interference was to be expected between the bilinguals' two languages. Should this hypothesis prove false, the most likely places for interference would be those where a feature is set to different values in the two languages, e.g. the use of *jibun* in the Nominative or the Genitive is acceptable in Japanese. This is not the case for the English reflexives. Differences between the judgements of bilinguals and monolinguals may also raise questions re the rules assumed to be in operation in the binding domain.

In the light of French/English experiments (Leigh 1997) which looked at the understanding of French/English bilinguals of anaphora compared to monolinguals, inconsistencies were expected across monolinguals.

The results of the pilot confirmed inconsistencies across monolinguals, but also showed that monolinguals and bilinguals occasionally differed in their interpretation of anaphora and that on some occasions this could be due to a second language effect.

The English data set was kept the same across the two experiment stages. The Japanese data set was expanded to include more constructions. A new experimental level was added, i.e. the repetition of the test across Japanese monolingual groups (see chapter 3 for the detailed experiment description).

Although the results of the pilot indicated possible interference in the bilinguals' set of rules, given the lack of homogeneity among the subjects and the small numbers of respondents in every cell (5), the hypotheses for the main experiment were kept the same as for the pilot, as follows:

- The bilinguals have two sets or rules, one for each language.
- No interference was expected in the bilinguals' language systems. In other words, it was expected that the bilinguals and the monolinguals would judge all constructions the same way (statistically speaking).
- The priming text (given to subjects to read immediately prior to the data collection) has no impact on these judgements.
- Inconsistencies as well as self-inconsistencies were expected across monolinguals. In other words, for at least some constructions a significant number of respondents (at least 30%) will disagree with the majority. Also, on repetition of the test, a degree of inconsistency for individuals will be apparent.
- P&P is expected to be a suitable syntactic framework for this thesis.
- The features for anaphora as described in the literature and captured in tables 2.2 and 2.3 are correct.

3. Experimental Design

This chapter describes the design of the experiments and the way they were conducted. Before looking at the experiments in detail, it addresses the issue of experiment design principles. It looks at the historical background of empirical linguistics and then at the design principles used, as against those recommended in the literature.

Two experiments were carried out. The purpose of the first one, the pilot study, was to establish whether there were differences between the way bilinguals, compared to monolinguals, interpreted anaphora. The main experiment was set up in the light of the results of the pilot study. It encompassed more constructions in the Japanese questionnaire as well as a larger number of subjects with more homogenous backgrounds.

Both experiments were carried out under the author's personal supervision.

For the purpose of the experiments, bilinguals were defined as people who had started using both Japanese and English for normal communicative purposes (e.g. other than having language lessons at school) before the age of 12. Allophones (speakers who had been using a third or fourth language for normal communicative purposes before the age of 12) were eliminated from the test population. Monolinguals were defined as people who had been solely using English or Japanese for normal communicative purposes up to the age of 12.

Each subject was given a set consisting of a language history questionnaire, a priming text and a data collection sheet. For the pilot, the language of the materials was English for all the language history questionnaires and Japanese or English for the priming text. For the main experiment, the language history questionnaire for Japanese monolinguals was translated into Japanese and printed in Romaji. All the questionnaires used for the main experiment can be found in Appendix C.

All language history questionnaires looked at the subjects' age, where they grew up and where their parents grew up. In addition, the bilingual questionnaires looked at the age and circumstances under which the two languages were acquired and first used actively, together with the areas the languages had been used in during the last two years, current use and the subjects' judgement on their relative fluency in the two languages.

Both the language history questionnaires and the data collection sheet were designed to be read in by scanner.

The language history questionnaires used were identical in contents for both experiments (see above). The English questionnaire was identical, while the Japanese questionnaire differed in content as discussed in the following sections.

The following terminology is used throughout the chapter:

- statement: a sentence in a questionnaire, offered for judgement on its own or with an interpretation

- interpretation: a proposed interpretation for a sentence
- item: an entry in a questionnaire. It could be a statement on its own or a statement and one of its interpretations. Items are referred to by a number and a prefix indicating whether they belong to the English or the Japanese questionnaire, e.g. EQ15.
- family: the set of items consisting of a given sentence and all its proposed interpretations.

3.1 Design Principles

The data on which linguists base their theories typically consists of acceptability judgements, i.e. of intuitive judgements of the well formedness or the meaning of utterances in a given language. A linguist will collect acceptability judgements by performing a small experiment on a monolingual speaker (if possible often himself or herself). Linguists are rarely concerned with methodological issues and typically none of the standard experimental controls are imposed during data collection.

3.1.1 Historical background

Empirical Linguistics was in vogue in the late 50's and early 60's. By the end of the 60's a number of researchers started criticising the way this was being used, to the point of stating that empiricism in this particular field is nonsense. (see Schütze 1996 for a thorough historical background) While judgements continued to be used, no real attempt at systemising the way data was collected and analysed was even attempted for a long

time, linguists being more than happy to consult their own intuitions and occasionally those of their colleagues.

Schütze (1996) aims to show that the methodological negligence that characterises the bulk of linguistic research can seriously compromise the data obtained, and argues for a more reliable mode of experimentation, similar to the one standardly used in experimental psychology.

Cowart (1997) and Bard et al. (1992) add to Schütze 's (1996) more theoretically oriented discussion by proposing procedures for eliciting acceptability judgements, by drawing on methods from experimental psychology, and showing how reliable, delicate data can be obtained using these procedures.

3.1.2 Principles proposed in literature

Judgements as evidence for Linguistic Theory

Acceptability judgements by monolingual speakers are generally accepted as the main type of evidence for linguistic theory. The use of such data is typically justified by a set of key arguments that Schütze (1996) summarises as follows:

- Acceptability judgements allow us to examine sentences that rarely occur in spontaneous speech or corpora.
- Judgements constitute a way of obtaining negative evidence, which is rare in normal language use.

- In observing naturally occurring speech data, it is difficult to distinguish errors (slips of the tongue, unfinished sentences, etc.) from grammatical production.
- The use of acceptability judgements allows us to minimise the influence of communicative and representational functions of language. Judgement data allow us to study the structural properties of language in isolation.

Competence and performance

Generative linguistics is based on the fundamental distinction between competence (the speaker – hearer’s knowledge of the language) and performance (the actual use of the language in concrete situations).

In this setting, a sentence is grammatical if it is generated by the grammar of the speaker, i.e. it is in accordance with the linguistic knowledge that the speaker has. Grammaticality is therefore a notion that pertains to linguistic competence. Whether a sentence is acceptable on the other hand, could be said to pertain to the behaviour of the speaker, therefore it is a question about linguistic performance. The competence/performance dichotomy entails that acceptability judgements are not sufficient to determine the grammaticality of a sentence. The performance of a speaker may be affected by distractions, shifts of attention and interest, memory limitations and random or characteristic errors in applying his /her knowledge to language.

In the present thesis we will assume that the competence/performance distinction carries over essentially unchanged to the investigation of the degree of acceptability (as opposed

to the investigation of binary acceptability that characterises mainstream linguistics). This means that we assume that some aspects of the gradient data are due to factors that pertain to grammatical competence, while others are due to performance effects.

Factors influencing acceptability judgements

Some of the most relevant factors outlined by Schütze (1996) as influencing acceptability judgements are:

- Measurement scales – they determine what type of data is obtained and which statistical operations if any can be carried out. Three types of scale are in operation. Nominal scales use labels such as “acceptable” and “unacceptable”. Such an approach assumes that acceptability is a binary notion. Under this assumption gradience can only emerge if the judgements of a number of speakers are pooled and frequency statistics computed. An ordinal scale has the same properties as a nominal scale but, in addition, an ordering relation is defined over the categories. Acceptability is measured on an ordinal scale if the traditional values of acceptable and unacceptable are supplemented by intermediate ones. Scales have been used consisting of 3 to twenty categories. It may be that the optimal number of categories varies with the problem under consideration. Interval scales presuppose that an ordering is defined over the measured categories. In addition, a distance relation has to be defined, i.e. it has to be possible to specify the difference between any two points on the scale. Recently, a number of researchers have argued that linguistic intuitions should be elicited on an interval scale, using magnitude estimation. (Bard et al. 1996)

- Instructions – in most experiments, the speakers that function as subjects are “naïve” and hence unlikely to be familiar with the linguistic concepts that they are supposed to apply in rating the stimuli. If no definitions for “grammaticality” or “acceptability” are provided, each subject will use her or his interpretation and the resulting data is likely to be very noisy.
- Subject-related factors – a number of such factors (field dependence – a concept used in personality assessment, left or right handedness, and linguistic training) have been identified as having a possible impact on acceptability judgements. In none of them is the experimental evidence clear-cut. However, in the case of linguistic training, it makes sense to assume judgements could be biased by theoretical expectations. The conclusion of both Schütze (1996) and Cowart (1997) is that it is preferable to use solely naïve speakers.
- The order of presentation – it has been found that this can affect responses, the suggestion therefore is that sentence order should be controlled for, either by randomisation or by balancing.
- Repetition – experiments carried out by Nagata (1989) show that repetition within a short interval leads to lower acceptability ratings, while repetition after long intervals (4 months) has no significant effect on judgements. Schütze (1996) notes that repetition also manifests itself in what is known as “linguists’ disease”, i.e. the blurring and uncertainty in one’s judgement after pondering long enough over many examples of the same type.

3.1.3 Experiment design versus controls proposed in literature

Schütze's (1996) and Cowart's (1997) make a number of recommendations for experiment design in terms of materials and procedure. The recommendations for materials cover presentation order, the stimulus set and context setting. These are listed below accompanied by comments relating them to the materials used for our experiments.

- Presentation order – counterbalance or randomise across subjects - this was not done, instead the questionnaires were administered in forward and reverse order to different groups of monolinguals. The computed differences were not significant.
- Stimulus set - should contain roughly the same number of acceptable and unacceptable sentences – this was indeed the case.
- Context – recommendation for context setting, however Keller (2000) finds no impact when isolated sentences are presented– no context setting.
- No use of sentences that might trigger processing problems (e.g. garden path sentences). – No such are used to our knowledge.
- Use of filler sentences – not used, as it would have made the questionnaire too unwieldy.

Schütze's and Cowart's recommendations re procedures to be used in experiments cover selection and number of subjects, use of instructions, data processing and evaluation.

Once again this is contrasted with the way our experiments were carried out.

- Selection of subjects – use naïve monolingual speakers. - Naïve monolingual speakers were used. Additionally the set of subjects was homogenised as much as possible to allow for comparing like with like.
- Large enough number of subjects for statistical analysis – This was done. Minimal cell size for the main experiment was 13 (minimum acceptable cell size for such experiments as ours is considered to be 5).
- Specific instructions, including examples – These were given and were supplemented by subject training at the start of the session.
- Rating scales – recent studies favour use of an interval scale based on magnitude estimation.- It was felt that the strong assumptions inherent in magnitude estimation were not met. A relative rating scale of 1 to 6 was used.
- Data processing – not mentioned specifically in the literature – the data collection forms, including data about the subjects, were set up to be scanned in and were scanned in, thus avoiding potential data entry errors.
- Evaluation – a certain amount of variation will remain in the experimental data, even if all necessary controls are applied. The only way of determining the significance of an effect is by performing statistical tests on the data. – Statistical tests were carried out and all data analysis was based on them.

3.2 The Pilot Study

3.2.1 Introduction

In a previous study (Leigh 1997) a comparison was carried out between monolinguals and French/English bilinguals in the domain of their understanding of anaphora. It was found that bilinguals use similar but not identical sets of rules to the monolinguals for their two languages. Additionally, there appeared to be some 2nd language impact in most cases in which there were statistically significant differences between the bilinguals and the monolinguals. English and French belong to the same language family and are typologically similar. Principles of economy in storage and processing would therefore be likely to lead to language interference. This is not the case for English and Japanese, so the assumption made for the pilot was that English/Japanese bilinguals will have separate sets of rules with no 2nd language impact.

The pilot study looked at the understanding by subjects of a number of anaphoric constructions that are supposed to exhibit differences between English and Japanese.

While the main thrust of the experiment was a comparison between bilinguals and monolinguals, a couple of side experiments were carried out, looking at the evolution if any of the interpretation of anaphoric constructions by ESL students at four different proficiency levels and the self consistency across time of a handful of Japanese monolinguals and ESL students.

The pilot study was carried out in England during May/June 1999, largely with a University or high school student population. There were four main groups of subjects:

TASIS students, the Mount School students, Oxford University students and English Language schools students.

After elimination of allophones and bilinguals who had a language other than Japanese or English as their second language, the following were left for analysis: 31 Japanese monolinguals, 14 Anglophones, 21 bilinguals out of whom 6 filled in an English text/English questionnaire (E/E), 5 a Japanese text/English questionnaire (J/E), 5 a Japanese text/Japanese questionnaire (J/J) and 5 an English text/Japanese questionnaire (E/J) as well as 53 ESL students (out of which 30 Japanese) who had filled in an English text/English questionnaire. The consistency tests involved 4 Japanese monolinguals and 5 Japanese ESL students.

3.2.2. Process

Subjects were trained in the type of judgements they were going to be expected to make using items 1 to 3.

They were then asked to read a priming text. This was either a two-page extract from *The Little Prince* by St. Exupery in English for the Anglophones and some of the bilinguals, or a short children's story in Japanese for the Japanese monolinguals and the remaining bilinguals. The purpose of this was twofold: as a 'mood setter' for all the subjects, as well as a language priming for the monolinguals.

The subjects were then shown sentences involving anaphoric constructions on an OHP (in English or in Japanese). Care was taken to ensure everybody could see and that no handicap (e.g. dyslexia) would interfere with the correct reading of what was being displayed. There were two types of items: for the first, the subjects had to judge the acceptability of a proposed interpretation for a potentially ambiguous statement on a sliding scale of 1 to 6 ((1 - not at all acceptable, 2 - barely acceptable, 3 - somewhat acceptable, 4 - fairly acceptable, 5 - almost fully acceptable, 6 - fully acceptable). Every statement in this group had at least one 'buddy' in the group, i.e. the same statement was offered with more than one interpretation. The detailed categorisation of the conditions tested shows the items in their respective groupings. For the second type of items the subjects were required to judge the acceptability of the statement itself. In either case they were asked to mark their answers on the data collection sheet. The data collection sheet had 6 circles for every statement. The subjects indicated their judgements by filling in the appropriate circle.

The decision to use an acceptability scale was taken following conversations with subjects after the pilot tests in earlier work (Leigh, 1997), which suggested that they had found it difficult to give black and white judgements, and was also influenced by Bard (1996). The use of 1 to 6 instead of, say, 1 to 5 was introduced to compensate for the observation that when in doubt many people take the easy way out and go for the middle answer. It was felt that the proffered scale offered sufficient flexibility, while at the same time not introducing too much complexity.

Each subject was then asked to complete a language history questionnaire. For bilinguals this included items regarding exposure and use of English and Japanese.

This study focused on the difference in the interpretation of anaphora between monolinguals and bilinguals. There were a number of items for which the monolinguals gave widely disparate answers. The study results were therefore analysed in two stages, the first stage being used to identify the items for which the monolinguals exhibited inconsistencies.

First stage analysis: chi-square tests

The first stage started with data reduction; the results on a scale of 1 (not acceptable) to 6 (fully acceptable) were reduced to a two value set by mapping values 1 to 3 to 1 and 4 to 6 to 2. The results of this analysis were used to determine the items for which monolinguals gave inconsistent results, i.e. for which they were split into two comparable groups (where such a split is defined as the smaller group having at least half the number of members of the larger group).

Second stage analysis: Mann-Whitney U tests

In the second stage, Mann-Whitney U tests were run on all the items, using the original data (on the scale of 1 to 6).

Mann-Whitney U tests are used to indicate whether there is a significant difference between the medians from two different groups of subjects. The significance level (which defines the value above which the samples are considered as exhibiting a significant difference) was set at the standard 5%.

The assumptions made when using Mann-Whitney U tests are that the observations within each sample are independent, that an ordinal level of measurement was carried out, and that the samples have equal variances. These assumptions were fulfilled.

The test is based on the ranking of scores and is not sensitive to issues like normality of population.

Under the null hypothesis the two samples being compared come from populations with the same distribution. The alternative hypothesis is that the medians in the samples are different. The samples are combined and a rank is assigned to each observation, 1 to the smallest, 2 to the next, etc. Under the null hypothesis one would expect that the scores from the two samples will be spread in the rank ordering, such that the sum of ranks for each sample will be similar. The test is used to calculate the probability of finding any given difference in rank sums under the null hypothesis. The directionality of the test can be chosen. Non-directionality was assumed (i.e. no assumption was made regarding monolinguals finding a given interpretation or sentence more or less acceptable than their counterparts). This was reflected in the use of the 2-Tailed P as a measure for the significance level of a given test (see Appendix B).

Within each language group, as determined by the language of the language history questionnaire, the Mann-Whitney U tests compared the responses of the monolinguals to bilinguals primed with the same language text as the monolinguals; monolinguals to bilinguals primed with the opposite language text to the monolinguals; and monolinguals to bilinguals as a whole.

Notation

JQn stands for Japanese item n.

EQn stands for English item n.

EQn+m+... stands for the variants of interpretation offered for a specific statement, e.g.

EQ27+32 stands for:

EQ 27 - John saw Peter's picture of himself.

= John saw Peter's picture of John.

and

EQ 32 - John saw Peter's picture of himself.

= John saw Peter's picture of Peter.

The notation $JQ_n+m+\dots$ has a similar interpretation.

For each construction tested, all the relevant items as well as the items for which the monolinguals disagree with each other are listed, e.g.

Relevant items: EQ5+16+9+23, EQ8+12+17, EQ10+36

Inconsistent: EQ9 , EQ17, EQ10

‘Inconsistent’ lists the items for which the monolinguals displayed inconsistencies, e.g.

Items 9, 17 and 10 in the above example. E/E denotes a bilingual who has read an English priming text and has answered an English language history questionnaire. J/E denotes a bilingual who has read a Japanese priming text and has answered an English language history questionnaire.

J/J denotes a bilingual who has read a Japanese priming text and has answered a Japanese language history questionnaire.

E/J denotes a bilingual who has read an English priming text and has answered a Japanese language history questionnaire.

The term ‘group’ is used to indicate Anglophones, Japanese monolinguals, or one of the four classes of bilinguals (J/J, E/J, E/J, J/E).

3.2.3 Pilot results

Out of the 44 items in the Japanese questionnaire and 60 in the English, 7 (15%) and 18 (30%) respectively elicited inconsistent answers from monolinguals (i.e. more than 30% of respondents disagreed with the majority verdict).

The bilingual respondents to the Japanese questionnaire exhibited significant differences from their monolingual counterparts in 13 items, 10 of which they judged as being more acceptable. The bilingual respondents to the English questionnaire, in a mirror image result, found 11 items significantly less acceptable than the Anglophones and 2 significantly more acceptable.

Some results appeared to indicate the impact of the priming language, e.g. English items 9, 23 and 17 were more acceptable to Anglophones than to bilinguals primed with a Japanese text. The equivalent Japanese items were unacceptable to the Japanese monolinguals and bilinguals.

As is obvious from the above, bilinguals in a large number of cases behave exactly like their monolingual counterparts, even when this behaviour is different for English and Japanese. This implies bilinguals possess two sets of rules, one for each language, which are similar to those of the respective monolinguals. These sets of rules are similar but not identical.

ESL's of Japanese origin appear overall to exhibit significant differences from the Anglophones, for the same items bilinguals do, indicating possible learning difficulties for monolinguals and bilinguals alike. The many additional significant differences indicate areas that could benefit from targeted teaching.

Consistency checks point to a lack of consistency in individual responses not only for ESL's but also for Japanese monolinguals.

Given the small number of respondents in the pilot, and their non homogenous background, there is little if anything to be gained in treating the results other than as an indication that it is worthwhile pursuing the data collection and analysis on a larger scale, with more homogenous groups.

3.2.4 Differences between the pilot and the main experiment

The main experiment used many more subjects than the pilot. The subjects themselves formed a far more homogenous set both in terms of education and language acquisition history.

The English questionnaire used was identical. 16 questions were added to the Japanese questionnaire. Some paralleled questions in the English questionnaire (e.g. EQ47 and EQ49, both involving backward binding). Others tested constructions in Japanese that had no equivalent in the English questionnaire (e.g. JQ60, pro-drop).

Data was collected from bilinguals and monolinguals in the same way as for the pilot (see below). Tests were carried out for self-consistency with Japanese monolinguals. No ESL data was collected.

3.3 *The Main Experiment*

3.3.1 Introduction

The experiment looked at the understanding by subjects of a number of anaphoric constructions which are supposed to exhibit differences between English and Japanese. While the main thrust of the experiment was a comparison between bilinguals and monolinguals, a side experiment was carried out looking at the effect of self-consistency over time.

The data collection was carried out with University of Delaware summer undergraduates during June 1999 and in October/November 1999 in Tokyo, largely with a University or high school student population. There were 7 groups of subjects: two groups of Waseda University students (Tokyo), three groups of Nanzan University students (Nagoya), Nishimachi school bilinguals and ASIJ bilinguals.

After elimination of allophones and bilinguals who had a language other than Japanese or English as their second language, the following were left for analysis: 133 Japanese monolinguals (out of whom 32 were given the items in reverse order); 31 Anglophones

(out of which 13 were given the items in reverse order); 74 (65) bilinguals out of whom 17 (14) filled in an English text/English questionnaire (E/E), 15 (13) a Japanese text/English questionnaire (J/E), 23 (21) a Japanese text/Japanese questionnaire (J/J) and 19 (17) an English text/Japanese questionnaire (E/J). The number in brackets indicates the number of subjects using both languages for normal communicative purposes by or before the age of 6. The consistency tests involved 49 Japanese monolinguals.

Additionally, the responses of the Japanese monolinguals were analysed as a function of the dialect spoken (Kanto ben around Tokyo, Nagoya ben around Nagoya, Kansai ben around Osaka and a mixed bag of other dialects). All the subjects were between 11 and 20.

3.3.2. Process

The process used for the main experiment was identical to that used for the pilot and is reported in 3.2.2.

3.3.3. Constructions examined

The constructions examined in both languages included locality, use of personal pronouns, interpretation of elided clauses, backward binding, no antecedent and modifiers. With the exception of elided clauses, a number of similar examples were given for each construction.

Many, but not all Japanese items had English equivalents and vice versa. A correspondence table between the English and the Japanese items where appropriate can be found in Appendix A.

The relevant items referred to are those from the following lists. The full questionnaires together with the Japanese gloss and the language history questionnaires can be found in Appendix C.

English items for which subjects were asked to judge the acceptability of the proffered interpretation:

4. Mary told Paula that Ann blamed herself.

= Mary told Paula that Ann blamed Ann.

5. John talked to Bill about himself.

= John talked to Bill about John.

6. John told Bill that he won the game.

= John told Bill that John won the game.

7. Peter defends himself better than Paul.

= Peter defends himself better than Paul defends Peter.

8. John showed Bill a picture of himself.

= John showed Bill a picture of John.

9. John talked to Bill about himself.

= John talked to Bill about Bill.

10. John told Bill that himself won the game.

= John told Bill that John won the game.

11. John told Bill that Peter blamed him.

= John told Bill that Peter blamed John.

12. Mary showed Ann a picture of herself.

= Mary showed Ann a picture of Mary.

13. Mary told Paula that Ann blamed herself.

= Mary told Paula that Ann blamed Mary.

14. Mary defends herself better than Ann.

= Mary defends herself better than Mary defends Ann.

15. John told Bill that Peter blamed him.

= John told Bill that Peter blamed Peter.

16. Mary talked to Ann about herself.

= Mary talked to Ann about Mary.

17. John showed Bill a picture of himself.

= John showed Bill a picture of Bill.

18. Peter defends himself better than Paul.

= Peter defends himself better than Paul defends Paul.

19. John told Bill that Peter blamed himself.

= John told Bill that Peter blamed John.

20. John saw Peter's picture of him.

= John saw Peter's picture of John.

21. Mary told Paula that Ann blamed herself.

= Mary told Paula that Ann blamed Paula.

22. Peter defends Mary better than Paul.

= Peter defends Mary better than Paul defends Mary.

23. Mary talked to Ann about herself.

= Mary talked to Ann about Ann.

24. John told Bill that he won the game.

= John told Bill that Bill won the game.

25. John told Bill that Peter blamed himself.

= John told Bill that Peter blamed Bill.

26. Mary defends Paula better than Ann.

= Mary defends Paula better than Mary defends Ann.

27. John saw Peter's picture of himself.

= John saw Peter's picture of John.

28. Both John and Peter know Bill. John talks to Peter about him.

= John talks to Peter about Bill.

29. John told Bill that Peter blamed him.

= John told Bill that Peter blamed Bill.

30. Peter defends himself better than Paul.

= Peter defends himself better than Peter defends Paul.

31. John talks to Peter about him.

= John talks to Peter about John.

32. John saw Peter's picture of himself.

= John saw Peter's picture of Peter.

33. Peter defends Mary better than Paul.

= Peter defends Mary better than Peter defends Paul.

34. John told Bill that Peter blamed himself.

= John told Bill that Peter blamed Peter.

35. John saw Peter's picture of him.

= John saw Peter's picture of Peter.

36. John told Bill that himself won the game.

= John told Bill that Bill won the game.

37. John talks to Peter about him.

= John talks to Peter about Peter.

English items for which subjects were asked to judge the acceptability of the given sentence:

38. Because Mary failed the test, she was very unhappy.

39. Stories about herself amused my sister.

40. They frighten themselves.

41. Mitiko finally introduced the young man whom herself loved to her parents.

42. That book about herself struck Mary on the head.

43. John depresses himself.

44. John saw a new self in the mirror.

45. Take someone like myself... I never drink coffee.

46. John told Mary things about herself.

47. Pictures of himself amused the man.

48. John likes my stories about myself.

49. That book about herself struck Mary as embarrassing.

50. History repeats itself.

51. That herself might have cancer worried Mitiko.

52. Mary thinks that she is a genius.

53. People like himself are always drinking coffee.

54. Was it John who went to the party ?

No, it was myself.

55. John told Mary things about himself.

56. John saw a new himself in the mirror.

57. John likes my stories about himself.

58. Every woman thinks that she is a genius.

59. People like him are always drinking coffee.

60. That book about himself struck John as embarrassing.

Take someone like herself... she never drinks coffee.

Japanese items for which subjects were asked to judge the acceptability of the proffered interpretation:

(in the Kanji version the names have been replaced as follows:

John - Kenji; Paul - Koji, Peter - Kazuo, Bill - Hiroshi, Mary - Mari)

4. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga Bill - o semeta - to itta.

5. John - ga Peter - ni kare - ni tuite hanashita.

= John - ga Peter - ni Peter - ni tuite hanashita.

6. John - ga Bill - ni jibun - ga siai - ni katta - to itta.

= John - ga Bill - ni Bill - ga siai - ni katta - to itta.

7. John - ga Bill - ni jibun - no koto - o hanashita.

= John - ga Bill - ni John- no koto - o hanashita.

8. Peter -wa Paul yori jibun - o umaku bengosuru.

**= Peter -wa Paul - o bengo suru yori jumaku jibun - o
bengosuru.**

9. John - ga Bill - ni jibun - no syasin - o miseta.

= John - ga Bill - ni John - no syasin - o miseta.

10. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga Peter - o semeta - to itta.

**11. Mary - wa Bill - ni jibun - no uchi de hon-o yoma-sa-re-
ta**

**= Mary - wa Bill - ni Mary - no uchi de hon-o yoma-sa-re-
ta.**

12. Mary - wa Bill - ni jibun - no kazoku-no hanashi bakari sa-re-ta.

**= Mary - wa Bill - ni Mary - no kazoku-no hanashi bakari sa-
re-ta.**

13. John - ga Bill - ni jibun - no syasin - o miseta.

= John - ga Bill - ni Bill - no syasin - o miseta.

14. John - ga Bill - ni jibun - ga siai - ni katta - to itta.

= John - ga Bill - ni John - ga siai - ni katta - to itta.

15. John - ga Bill - ni jibun - no koto - o hanashita.

= John - ga Bill - ni Bill- no koto - o hanashita.

16. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga John - o semeta - to itta.

17. Mary - wa Bill - ni jibun - no uchi de hon-o yoma-sa-re-ta.

= Mary - wa Bill - ni Bill - no uchi de hon-o yoma-sa-re-ta.

18. Mary - wa Bill - ni jibun - no kazoku-no hanashi bakari sa-re-ta.

= Mary - wa Bill - ni Bill - no kazoku-no hanashi bakari sa-re-ta.

19. Peter - wa Paul yori Mari - o umaku bengosuru.

= Paul - o bengo suru yori Mary - o umaku bengosuru.

20. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga Bill - o semeta - to itta.

21. Peter - wa Paul yori Mari - o umaku bengosuru.

= Peter - wa Paul -ga Mari - o bengo suru yori umaku Mari - o bengosuru.

22. Dono zyosei - mo kanozyo - ga tensai-da to omotte-iru.

= Dono zyosei - mo Mary - ga tensai-da to omotte-iru.

23. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni Bill - ga siai - ni katta - to itta.

24. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga John - o semeta - to itta.

25. Peter - wa Paul yori jibun - o umaku bengosuru.

= Peter - wa Paul - ga Paul - o bengo sum yori umaku jibun - o bengosuru.

26. John - ga Peter - ni kare - ni tsuite hanashita.

= John - ga Peter - ni John - ni tsuite hanashita.

27. John - ga Peter - no jibun - no shashin - o mita.

28. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni John - ga siai - ni katta - to itta.

29. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga Peter - o semeta - to itta.

30. Peter - wa Paul yori jibun -o umaku bengosuru.

= Peter -wa Paul - ga Peter - o bengo sum yori umaku jibun- o bengosuru.

35. Mary - ga shiken-ni ochi-ta node, kanozyo - wa totemo zannengat-ta.

= Mary - ga shiken-ni ochi-ta node, Mary - wa totemo zannengat-ta.

38. Dono zyosei - mo kanozyo - ga tensai-da to omotte-iru.

ta.

= Dono zyosei - mo jibun - ga tensai-da to omotte-iru.

44. Mary - ga kanozyo - ga tensai-da to omotte-iru.

= Mary - ga Mary - ga tensai-da to omotte-iru.

**46. John - to Paul -wa tomodachi da. John- ga jibun - ga tensai-da
to omotte-iru.**

= John - ga John - ga tensai-da to omotte-iru.

**47. Mary - ga shiken-ni ochi-ta node, kanozyo - wa totemo zannengat-
ta.**

**= Mary - ga shiken-ni ochi-ta node, Mary - no okaasan - wa
totemo zannengat-ta.**

48. John - wa Mary - ga jibun - o aisite iru koto - o sitte ita.

= John - wa Mary - ga John- o aisite iru koto - o sitte ita.

52. Mary - ga jibun - o aisite inai koto - ga John - o gakkari-sase-ta.

**= Mary - ga Mary - o aisite inai koto - ga John - o gakkari-sase-
ta.**

53. John - ga watashi - no jibun - ni kansuru hanashi - o kiniit - ta.

= John - ga watashi - no John - ni kansuru hanashi - o kiniit - ta.

**54. John - to Paul -wa tomodachi da. John - ga jibun - ga tensai-da
to omotte-iru.**

= John - ga Paul - ga tensai-da to omotte-iru.

55. Mary - ga kanozyo - ga tensai-da to omotte-iru.

**= Mary - ga Mary - no okaasan - ga tensai-da to omotte-
iru.**

56. Jibun - ni kansuru hon - ga Mary - no atami - ni ochi - ta.

57. John - wa Mary - ga jibun - o aisite iru koto - o sitte ita.

= John - wa Mary - ga Mary - o aisite iru koto - o sitte ita.

58. John - ga watashi - no jibun - ni kansuru hanashi - o kiniit - ta.

**= John - ga watashi - no watashi - ni kansuru hanashi - o kiniit -
ta.**

59. Mary - ga jibun - o aisite inai koto - ga John - o gakkari-sase-ta.

= Mary - ga John - o aisite inai koto - ga John - o gakkari-sase-ta.

*Japanese items for which subjects were asked to judge the acceptability of the given
sentence:*

(in the Kanji version the names have been replaced as follows:

John - Kenji; Paul - Koji, Peter - Kazuo, Bill - Hiroshi, Mary - Mari)

31. Jibun - ga gan kamo sirenai koto-ga Mitiko - o nayam-sase-ta.

**A: Dareka - ga John - no kawari - ni sono party - ni itta -
esu - ka.**

lie, jibun - de kita - ndesu.

Gakusei - ga mina jibun - tachi - o semeta.

John - ga jibun - no heya - de benkyo shiita.

**John - wa Peter -ga jibun - ni kasite yatta hon - o nakushite
matta.**

**Jibun - no sukina seinen-o Mitiko - wa yatto ryoasin-ni syookai
l.**

Kodomo - ga jibun - no uchi - e hasitte - itta.

John - ga kagami - no naka - ni atarashii jibun - o mitsuketa.

Gakusei - ga mina jibun - o semeta.

**John - wa Peter -ga jibun - ni kasite kureta hon - o nakushite
matta.**

Jidosha - ga jibun - no syako -no hoo - e hasiridashita.

Dono dansei - mo jibun - ga eiyuu-da to omotte-iru.

Jibun - ga baka na koto-ga John-o kanasima-se-ta.

Jibun - no shashin - ga otoko -o warawa - se - ta.

Jibun - ni kansuru hon - ga Maty - no mune - o ut - ta.

John - ga tensai-da to omotte-iru.

Locality

Six English items and their variants, together with 11 Japanese items and their variants were used to test locality, including picture NPs with local subjects.

Relevant items: JQ7+15, JQ9+13, JQ11+17, JQ12+18, JQ14+6, JQ34,
JQ16+20+10, JQ24+4+29, JQ27, JQ53+58, JQ45, and JQ46+54
EQ5+16+9+23, EQ8+12+17, EQ10+36,
EQ19+4+25+13+34+21, EQ27+32, EQ57+48

Inconsistent: JQ11, JQ18, JQ10, JQ58, JQ46
EQ23, EQ17, EQ10, EQ27, EQ57

Use of personal pronouns

The use of personal pronouns was tested by a family of five items in Japanese and seven in English.

Relevant items: JQ28+23, JQ26+5, JQ38+22, JQ44+55, JQ35+47
EQ6+24, EQ31+37+28, EQ52, EQ58, EQ38, EQ11+29+15,
EQ20+35

Inconsistent: JQ22, JQ47
EQ37, EQ11, EQ35

Interpretation of elided clauses

Two types of elided items were tested in both Japanese and English.

Relevant items: JQ25+30+8, JQ21+19
EQ18+7+14+30, EQ22+33+26

Inconsistent: JQ8, JQ19
EQ7, EQ30, EQ33, EQ26

With psych verbs

Two English items and a Japanese one were used to test the acceptability of binding by the subject:

Relevant items: JQ48+57
EQ40, EQ43

Inconsistent:

Backward Binding

Seven Japanese and five English examples to test the acceptability of binding by a succeeding antecedent:

- Relevant items: JQ37, JQ31, JQ49, JQ52+59, JQ50, JQ51, JQ56
- EQ41, EQ51, EQ47+39, EQ49+60, EQ42
- Inconsistent: JQ56, JQ49, JQ59
- EQ39, EQ49, EQ42

No antecedent

The acceptability or otherwise of constructions devoid of antecedents was tested by using one example in Japanese and two in English:

- Relevant items: JQ32
- EQ54, EQ45+59+53
- Inconsistent: JQ32
- EQ54, EQ53

Agreement

Agreement was tested by using three examples in Japanese and one in English:

Relevant items: JQ39+43, JQ33+41
EQ55+46+50

Inconsistent:

Modifiers

The acceptability or otherwise of constructions including modifiers was tested by using one example in Japanese and one in English:

Relevant items: JQ40
EQ56+44

Inconsistent: EQ44

Empathy

The impact of empathy was tested by using one example in Japanese.

Relevant items: JQ42+36

Inconsistent:

pro-drop

The acceptability of pro-drop in Japanese was tested by one example.

Relevant items: JQ60

Inconsistent: JQ60

The last three categories (modifiers, empathy, pro-drop) have only one example each.

The results in these categories should be treated with caution.

4. Results

In this chapter the results of the main experiment are described and discussed. A summary of the results and the processed data can be found in Appendices A and B. The introduction recapitulates the main points of the experimental design. The analysis method is then described and justified, and issues that might distort the collected data addressed. The results for every construction tested are grouped according to whether there was a statistically significant difference between the responses of the bilinguals and the monolinguals or not and the possible second language impact examined. The degree of agreement between monolinguals' responses and the expected responses is looked at, as well as the degree of consistency between the monolinguals' responses as a group and as individuals. The chapter concludes with a summary of the main results.

The hypotheses set forward in chapter two are recapitulated here for convenience:

- No interference is expected in the bilinguals' language systems. In other words, it was expected that the bilinguals and the monolinguals would judge all constructions the same way (statistically speaking).
- No priming effects are expected
- Inconsistencies as well as self-inconsistencies are expected across monolinguals. In other words, for at least some constructions a significant number of respondents (at least 30%) will disagree with the majority. Also, on repetition of the test, a degree of inconsistency for individuals will be apparent.
- P&P is expected to be a suitable syntactic framework for this thesis.

The following terminology is used throughout the chapter:

- **statement:** a sentence in a questionnaire, offered for judgement on its own or with an interpretation
- **interpretation:** a proposed interpretation for a sentence
- **item:** an entry in a questionnaire. It could be a statement on its own or a statement and one of its interpretations. Items are referred to by a number and a prefix indicating whether they belong to the English or the Japanese questionnaire, e.g. EQ15.
- **family:** the set of items consisting of a given sentence and all its proposed interpretations.

Sequential numbering is used for the examples: one per family or one per item for individual items.

English language families are presented as follows: the generic sentence or phrase, including co-referencing, followed by the items as they appear in the questionnaire. Japanese language families include the generic sentence or phrase in Japanese including co-referencing, followed by the English transliteration, and followed by the English translation of the items that appear in the questionnaire. This is done in order to make the reader's life easier. The actual questionnaire entries can be found in the Appendix.

4.1 Introduction

Each subject was given a socio-linguistic questionnaire (for bilinguals this included items regarding exposure and use of English and Japanese), a priming text and a linguistic questionnaire containing two types of items. The first type consisted of a statement and

an offered interpretation of that statement. The subjects were asked to judge the acceptability of the proffered interpretations on a scale of 1 to 6 (1 - unacceptable, 6 - fully acceptable). Every statement of this type was offered with more than one interpretation, e.g.:

(1) EQ27. *John saw Peter's picture of himself.*

= *John saw Peter's picture of John.*

and

(2) EQ32. *John saw Peter's picture of himself.*

= *John saw Peter's picture of Peter.*

For the second type, subjects were required to pass judgement on the acceptability of the proffered statements themselves, e.g.:

(3) EQ42. *That book about herself struck Mary on the head.*

For the purpose of the experiment, bilinguals were defined as people who had started using both Japanese and English for normal communicative purposes (e.g. other than having language lessons at school) before the age of 12 and who were considered as fully balanced bilinguals by their teachers. In the event, only a small number of respondents had started using both languages after or at the age of 7. These were eliminated from the analyses, restricting the age of active use to 6 and below.

Anglophones received an all-English set, Japanese monolinguals an all-Japanese set, bilinguals one of four combinations E/E, J/E, J/J, E/J. (The first letter refers to the language of the priming text, the second to the language of the linguistic questionnaire).

4.2 Data analysis

There were a number of items for which the monolinguals gave widely disparate answers. The data were therefore analysed in two stages, the first stage being used to identify the items for which the monolinguals exhibited inconsistencies.

A number of lines of inquiry were followed, e.g.: questionnaire learning effect, consistency of respondents over time, dialect impact for monolinguals and age impact for bilinguals. This was done in order to eliminate the impact of possible extraneous factors on the results.

Appendix D shows the raw data pertinent to the comparison between bilingual and monolingual judgements in the form of graphs representing the response frequency distribution for the values 1 to 6.

4.2.1 First stage analysis: chi-square tests

The first stage started with data reduction; the results on a scale of 1 (not acceptable) to 6 (fully acceptable) were reduced to a two value set by mapping values 1 to 3 to 1, and 4

to 6 to 2. To facilitate processing a chi-square test was applied to the reduced data set and the tabulated output examined visually. The results of this analysis were used to identify the items for which monolinguals gave inconsistent results, i.e. for which they were split into two comparable size groups (where such a split is defined as the smaller group having at least half the number of members of the larger group). The cases for which the monolinguals gave inconsistent results are documented in section 4.6.2. Both this and the following stage involved the use of the statistical software package SPSS versions 9.0 and 10.0 SPSS Inc., Chicago.

4.2.2 Second stage analysis: Mann-Whitney U tests

In the second stage, Mann-Whitney U tests were applied to the original data (on the scale of 1 to 6).

Mann-Whitney U tests are used to determine whether there is a significant difference between the data collected from two independent groups of subjects. The significance level of the tests was set at 5%.

Within each language group, as determined by the language of the linguistic questionnaire, the Mann-Whitney U tests compared the responses of the monolinguals versus bilinguals, primed with the same language text as the monolinguals; monolinguals versus bilinguals, primed with the opposite language text to the monolinguals; and monolinguals versus bilinguals as a whole.

The results of the Mann-Whitney U tests are detailed below.

The cases for which no statistically significant results were obtained as a result of the Mann-Whitney U tests, are grouped together in section 4.3. The cases that exhibited statistically significant differences can be found in section 4.3. Only results attaining the set significance level are mentioned.

4.3 Constructions: no statistically significant differences

This section groups together all the constructions for which the monolinguals and the bilinguals exhibited no statistically significant differences, for which English and Japanese differ or differ potentially, i.e. the constructions which exist in one language but not the other. If any member of a family of items exhibits significant differences, this family as a whole will be examined in the next section.

Constructions for which English and Japanese differ and for which the bilinguals' responses correspond to those of the monolinguals indicate that bilinguals have separate rules for their two languages, rules which at least in the constructions below do not differ from those of the respective monolinguals. The ability to handle features available in one language but not the other, e.g. empathy is also an indication that bilinguals have two separate sets of rules.

The section is organised into two subsections; subsection 4.3.1 deals with reflexives, subsection 4.3.2 with pronouns.

A construction is considered as acceptable by a given group if more than 67% of the individuals in the group consider it so (a score of 4 to 6 on a scale of 1 to 6). It is considered as unacceptable by a given group if more than 67% of the individuals in the group consider it so (a score of 1 to 3 on a scale of 1 to 6).

4.3.1 Reflexives

Subject position

In English, reflexives on their own can't be used in a subject position, whereas in Japanese they can. Both the Japanese monolinguals and the Anglophones conform to these expectations. The statement:

(4) 'John_i - ga Bill_j - ni jibun_i/*_j - ga siai - ni katta - to itta.'

John-NOM Bill-DAT self-NOM that game-DAT won-COMP said

JQ14. *John said to Bill that John won the game.*

is acceptable to the Japanese monolinguals. Its English equivalent:

(5) EQ10. *John told Bill that himself won the game.*

= John told Bill that John won the game.

is found unacceptable by the English monolinguals. One might expect bilinguals to be influenced by their second language. In fact, the bilinguals' judgements are fully in agreement with the appropriate monolinguals, indicating the bilinguals are clear on the subject position rule in their two languages.

According to the literature, in Japanese, the binding to a subject is given preference over that to an object, which in most cases is considered unacceptable. In the examples below the monolinguals accept the use of the reflexive to indicate possessive for the subject binding, but reject it for the object as expected, accepting JQ11 and rejecting JQ17.

(6) *'Mary_i - wa Bill_j - ni jibun_i/_{*j} - no uchi de hon-o yoma-se-rare-ta.'*

Mary-Top Bil-DAT self-GEN house in book-ACC read-cause-passive-past

Mary was made by Bill to read the book in self's house.

JQ11. *Mary was made by Bill to read the book in Mary's house.*

JQ17 *Mary was made by Bill to read the book in Bill's house.*

In English, with the exception of the picture constructions, this use of the reflexive is not possible and no parallel examples are given in the English questionnaire. On the other hand, a reflexive can be bound to an object as well as to a subject. Bilinguals could plausibly be affected by this difference but they are not. They agree with their monolingual counterparts in the acceptability of the possessive use of the reflexive in Japanese as well as of the subject orientation.

Interestingly, both the Japanese monolinguals and their bilingual counterparts forget all about subject orientation when a psych verb is involved and accept the object orientation instead. This is presumably due to the fact that the semantic object of a psych verb is the logical subject as the experiencer. In the next example, an EO (experiencer object) binds a reflexive in a backward binding construction. The Japanese monolinguals accept it as

valid. Its counterpart is considered not acceptable in English, as the reflexive can't occupy a subject position. (but was not tested)

(7) 'Jibun_i - ga baka na koto-ga John_i - o kanasima-se-ta.'

self-NOM fool is that John-ACC sad-made-past

JQ49. The fact that (he) himself is a fool saddened John.

The bilinguals accept the construction, showing no influence from their second language and demonstrating that the use of a psych verb causes the subject preference to be overridden. This becomes even clearer when two different interpretation (subject oriented and object oriented) are proposed:

(8) 'Mary_i - wa Bill_j - ni jibun_{i/j} - no kazoku-no hanashi bakari sa-re-ta.'

Mary-Top Bil-DAT self-GEN family-GEN talk only do-passive-past

Mary was affected by Bill's talking only about self's family.

JQ12. Mary was affected by Bill's talking only about Mary's family.

JQ18. Mary was affected by Bill's talking only about Bill's family.

Monolinguals and bilinguals alike reject JQ12, with the subject oriented binding, while JQ18, featuring the object orientation, is accepted by both categories. (Note: The two sets of examples JQ11 and JQ17 and JQ12 and JQ18 are consecutive in the questionnaire, which may not have been a good idea. On the other hand, there is no really significant difference between the respondents to the questionnaire in forward and reverse order, indicating that this proximity did not distort the results.)

A similar effect occurs with a psych verb without the use of the reflexive to express possession:

(9) *Mary_i - ga jibun_{ij} - o aisite inai koto - ga John_j - o gakkari-sase-ta.* ’

Mary-NOM self-ACC loving is not that John-ACC distressed-made- past.

The fact that Mary did not love herself/himself distressed John.

JQ52. *The fact that Mary did not love herself distressed John.*

JQ59. *The fact that Mary did not love himself distressed John.*

The monolinguals override the subject orientation rule and accept instead the object orientation in which the reflexive is bound to John (JQ59). This gives the bilinguals an additional obstacle to overcome, as in English the reflexive has to be bound inside its governing category, in this case to Mary. However the bilinguals judge the two sentences in the same way as the Japanese monolinguals, rejecting the subject orientation and unfazed by their second language.

Experiencer subject and object verbs

In English, the direct object of an EO (experiencer object) verb such as amuse/frighten can bind a reflexive.

(10) EQ39. *Stories about herself amused my sister.*

EQ39 is found acceptable by Anglophones, as expected. There is no equivalent to this in Japanese (according to my informant, a Japanese linguist, it can’t be translated), this however does not stop the bilinguals from agreeing with the monolinguals.

The direct object of an EO (experiencer object) verb can bind a reflexive, however this is not judged as very acceptable if the verb is used non-figuratively. The Anglophones reject EQ42. The nearest equivalent in Japanese uses a non-psych verb and is judged as acceptable by the Japanese monolinguals. The bilinguals appear to differentiate between their two sets of rules, rejecting binding with the direct object of an EO for a psych verb used non-figuratively in English.

(11) EQ42. *That book about herself struck Mary on the head.*

In English the subjects of ES (experiencer subject) verbs can bind an anaphor.

(13) EQ40. *They frighten themselves.*

This has no equivalent in Japanese and is acceptable to Anglophones and bilinguals alike, indicating the bilinguals are clear about this rule and not affected by the inability of expressing this in Japanese.

Inanimate antecedent

In Japanese anaphora cannot refer to an inanimate object (JQ43), in English it can (EQ50).

(14) EQ50. *History repeats itself.*

(15) ''**Jidosha - ga jibun - no syako -no hoo - e hasiridashita.*''

car-NOM self-GEN garage-GEN direction-to began to run

JQ43. *The car began to move to self's garage.*

The bilinguals are in agreement with their monolingual counterparts.

Bound variable reading

‘jibun’ can be co-referenced with a bound variable. The Japanese monolinguals accept this.

(16) *‘Dono dansei_i - mo jibun_i - ga eiyuu-da to omotte-iru.’*

Every man-also himsef-NOM hero-COP COMP think-PRES

JQ45. *Every man thinks himself is a hero*

(only one interpretation possible)

The English equivalent is unacceptable, as the reflexive can’t occupy a subject position.

Nevertheless the bilinguals appear to keep their grammars separate and accept the sentence, indicating they accept the binding of ‘jibun’ with a bound variable.

Discourse referent possibilities

In English, there are a number of constructions devoid of antecedent, yet grammatical.

The examples used have no equivalent in Japanese. The Anglophones find the first two acceptable and are split on the third, which overall they reject. The bilinguals agree with them and are not influenced by the inability of expressing this in their second language.

(17) EQ45. *Take someone like myself... I never drink coffee.*

(18) EQ59. *People like him are always drinking coffee.*

(39) EQ53. *People like himself are always drinking coffee.*

In Japanese, according to the literature it is possible to have antecedent-less constructions that refer to what had already been said. The following should therefore be acceptable, however the monolinguals reject it.

(20) A: *Dareka - ga John - no kawari - ni sono party - ni itta - ndesu - ka.*

Someone-NOM John-GEN in place of that party to went-it is that-Q

JQ32A Is it that someone went to the party instead of John?

B: *Iie, jibun - de kita - ndesu.*

No, self-NOM came-it is that

JQ32B No, he came by himself.

In English the following antecedent-less construction is supposed to be unacceptable, however the Anglophones are quite happy with it.

(21) *EQ54. Was it John who went to the party ?*

No, it was myself.

In both cases the bilinguals agree with their appropriate monolinguals in rejecting the above antecedent-less construction in Japanese and in accepting it in English.

In Japanese under certain conditions long distance binding is permitted.

(22) *Mary_i - ga jibun_{i/j} - o aisite inai koto - ga John_j - o gakkari-sase-ta. '*

Mary-NOM self-ACC loving is not that John-ACC distressed-made- past.

The fact that Mary did not love herself/himself distressed John.

JQ52. *The fact that Mary did not love herself distressed John.*

JQ59. *The fact that Mary did not love himself distressed John.*

The monolinguals override the subject orientation rule and accept instead the object orientation, which is long distance and in which the reflexive is bound to John (JQ59). (The semantic object of the psych verb is the logical subject as the experiencer) In English the reflexive has to be bound inside its governing category, in this case to Mary so JQ52 would be acceptable, but JQ59 would not. However, the bilinguals judge the two sentences in the same way as the Japanese monolinguals, accepting the long distance binding and unfazed by their second language. (These examples appear as well in the subject orientation section)

Possessive

In Japanese the reflexive can be used in the Genitive to indicate possession.

(23) ‘ *John_i - ga jibun_i - no heya - de benkyo shita.* ’

John-NOM himself-GEN room-in studied

JQ34. John studied in self's room.

As expected the monolinguals find this example acceptable. In English, with the exception of the picture constructions (John likes Peter's picture of himself), the reflexive can't be used to express the possessive and no equivalent example exists in the English questionnaire. Possession is expressed instead by possessive pronouns, e.g. his/her. This difference does not appear to confuse the bilinguals, who agree with their monolingual counterparts, demonstrating they have fully assimilated the acceptability of using the reflexive to express possessive in Japanese.

A similar phenomenon is involved in an example of backward binding with a reflexive pronoun in Japanese. In Japanese, backward binding is acceptable according to the literature. (see chapter 2.) For example:

- (24) *'Jibun_i - no sukina seinen-o Mitiko_i - wa yatto ryoasin-ni syookai sita.'*
self-GEN loved young man-ACC Mitiko-Top finally parents-to introduced
JQ37. Mitiko finally introduced the young man whom self loved to her parents

The monolingual Japanese accept the above. The Anglophones reject the nearest construction:

- (25) *EQ41. Mitiko finally introduced the young man whom herself loved to her parents.*

as the reflexive can't be used in the subject position. Note that it is not possible to construct a grammatical sentence from the above example that would include backward binding. The bilinguals have two reasons to differ from their monolingual counterparts: the use of the reflexive in the subject position in the English version, (acceptable in Japanese but not in English) and the use of the reflexive to indicate possession in the Japanese version (again acceptable in Japanese but not in English). The bilinguals manage to process the two languages in the same way as the monolinguals, showing they can cope with the rule governing the use of reflexives in the subject position, as well as the use of the reflexive to indicate possession.

Empathy

In Japanese, there are a number of verbs for give/take representing various scales of empathy. 'jibun' can bind some but not others. This has no equivalent in English. The

Japanese monolinguals accept JQ42 and reject JQ36 as expected. The bilinguals agree with them, demonstrating they are clear on the impact of the degree of empathy on the feasibility of binding.

(26) ‘*John_i - wa Peter -ga jibun_i - ni kasite kureta hon - o nakusite simatta.*’

‘**John_i - wa Peter -ga jibun_i - ni kasite yatta hon - o nakusite simatta.*

John-Top Peter-NOM self-to lending gave book-ACC losing ended up

JQ42/JQ36. John has lost a book that Peter has lent him.

Jibun-zisin

‘Jibun-zisin’, a more rarely used variant of ‘jibun’, has a similar scope to the English reflexive i.e. must be bound within its governing category. It is invariant with respect to case, gender and number.

(27) ‘*John_i - ga Bill_j - ni Peter_k - ga jibun - zisin*_{i/j/k} - o semeta - to itta.*’

John-NOM Bill-to Peter-NOM self-ACC blamed-COMP said

John said to Bill that Peter blamed ‘himself’.

JQ24. John said to Bill that Peter blamed John.

JQ4. John said to Bill that Peter blamed Bill.

JQ29. John said to Bill that Peter blamed Peter.

As expected, the monolinguals accept JQ29 and reject JQ4 and JQ24. The bilinguals agree with them, having fully assimilated the rules for ‘jibun-zisin’ (bound within its governing category).

4.3.2 Personal pronouns

In Japanese 'jibun' is very frequently used. In the author's recent experience it appeared in almost every sentence. On the other hand personal pronouns are used much more seldom. This frequency in usage is the opposite to that of English.

Principle B

In English, pronouns conform to Principle B which states that pronouns must be free within their governing category. Statements like:

(28) *EQ52. Mary thinks that she is a genius.*

are acceptable in English, whether 'she' refers to Mary or to someone outside the sentence. In Japanese, the only acceptable binding is supposed to be outside the sentence, so JQ55 should be acceptable.

(29) 'Mary_i - ga kanozyo_{i/j} - ga tensai-da to omotte-iru.'

Mary-NOM she-NOM genius-COP COMP think-PRES

JQ44. *Mary thinks that Mary is a genius.*

JQ55. *Mary thinks (that) Mary's mother is a genius.*

The monolingual Japanese reject both versions. (Had 'jibun' been used instead the expectation would have been complementary, i.e. JQ44 OK, JQ55 not) The bilinguals concur with both sets of monolinguals, showing they have assimilated the need for a pronoun in English to be free in its governing category. It is not obvious from the data what rule is supposed to be operational in Japanese.

Double possessive

In English, the possessive can be indicated by a part of speech preceding and/or following the possessed. In Japanese only the first option is possible, so the following have no equivalent:

(30) EQ20. *John saw Peter's picture of him.*

= *John saw Peter's picture of John.*

(31) EQ35. *John saw Peter's picture of him.*

= John saw Peter's picture of Peter.

The first interpretation should be acceptable, the second one not. Bilinguals and monolinguals fully accept the first and reject the second, showing that the subject of the embedded DP counts as restricting the binding domain in the same way as the subject IP. There are no significant differences between the monolinguals and the bilinguals, showing that the bilinguals have assimilated the rule and are not influenced by the unacceptability of the construction in Japanese.

4.4 Constructions: statistically significant differences

This section groups together all the constructions for which the monolinguals and the bilinguals exhibited statistically significant differences. Overall, out of 57 items in the English questionnaire (excluding the three training items), 10 exhibited significant differences in at least one category (E/E, J/E, E+J = all bilinguals who filled in this questionnaire). Six items exhibited differences in at least two categories. Out of the 57 items in the Japanese questionnaire (excluding the three training items), 11 exhibited significant differences in at least one category, 5 of which appear in two categories or

more. Overall, in 15 out of 21 items the bilinguals veer towards a middle position (they judge the item or its interpretation as less acceptable if the monolinguals find it acceptable, and more acceptable if the monolinguals find it unacceptable). This is also the case for all the items but one (EQ6), where significant differences are exhibited by two or more categories of bilinguals. The bilinguals' answers to 7 items in the English questionnaire, 9 in the Japanese (16 out of 21) appear to indicate an impact from the bilinguals' second language.

For every case the question of a possible priming effect has been looked at. A priming effect is considered to be possibly in operation iff a second language effect is exhibited by bilinguals having read the priming text in a language different to that of their questionnaire. If such an effect is exhibited by all bilinguals regardless of priming text no priming effect is considered to be in operation. Overall out of 10 items showing significant differences in the English questionnaire only one exhibits a possible priming effect. This goes up to 5 out of 11 for the Japanese questionnaire. Overall a total of 6 out of 21 items exhibit a possible priming effect. This is low and therefore points to the likelihood that overall no priming effect is in operation as such.

The section is organised into two subsections, 4.4.1 deals with reflexives, 4.4.2 with pronouns. Each sub-subsection has a commentary on the possible existence or otherwise of a second language effect.

4.4.1 Reflexives

Subject position

In Japanese an anaphor can occupy a subject position. JQ31, in which the reflexive in subject position is backward bound to an object, is expected to be acceptable:

(32) *'Jibun_i - ga gan kamo sirenai koto-ga Mitiko_i - o nayam-sase-ta.'*

self-Nom cancer may have that Mitiko-Acc worried-make-past

That herself might have cancer worried Mitiko

JQ31. Jibun - ga gan kamo sirenai koto-ga Mitiko - o nayam-sase-ta.

It is found less acceptable by bilinguals who have read a Japanese text and by the bilinguals overall, restricting the acceptability of a reflexive in a subject position.

Possible 2nd language impact

This appears to be the effect of backward binding, as the bilinguals are in complete agreement with their monolingual counterparts in JQ14, which exhibits a reflexive in a subject position and no backward binding. In English an anaphor can not be used in a subject position. Backward binding is allowed only in special circumstances, when the reflexive is preceded by a noun and the preposition 'of' or 'about' and a psych verb is involved (EQ41, EQ51, EQ47, EQ39, EQ49, EQ60, EQ42) so EQ51 should be unacceptable:

(33) *EQ51. That herself might have cancer worried Mitiko.*

The Anglophones reject this question as do their bilingual counterparts, as in English a subject cannot occupy a subject position. A second language effect is apparent for the bilinguals who filled in the Japanese questionnaire.

Priming effect: none.

Object binding

In English a reflexive can be bound to an object as well as a subject. EQ46 in which the reflexive is bound to the object 'Mary' is indeed fully acceptable to Anglophones, but less acceptable to all groups of bilinguals.

(34) EQ46. John told Mary things about herself.

Possible 2nd language impact

There is no direct equivalent for this item in the Japanese questionnaire. However, as in Japanese reflexives exhibit a strong subject orientation, (EQ55, in which the reflexive is co-referenced with the subject is found fully acceptable by all respondents). a second language effect may well be in operation.

(34a) EQ55. John told Mary things about himself.

Priming effect: none.

Long distance anaphora

In Japanese the reflexive can be used for long distance binding. JQ48 and JQ57 should both be acceptable as one proposes binding to a topic, the other to a subject. The

monolinguals find the topic in JQ48 (the long distance binding) acceptable and reject the subject binding in JQ57.

(35) 'John_i - wa Mary_j - ga jibun_{i/j} - o aisite iru koto - o sitte ita.'

John-topic Mary-Nom self-Acc is loving that knowing was

John knew tha Mary loves himself/herself

JQ48. John - wa Mary - ga jibun - o aisite iru koto - o sitte ita.

= John - wa Mary - ga John- o aisite iru koto - o sitte ita.

John knew that Mary loves himself

JQ57. John - wa Mary - ga jibun - o aisite iru koto - o sitte ita.

= John - wa Mary - ga Mary - o aisite iru koto - o sitte ita.

John knew that Mary loves herself

JQ48 is found less acceptable by bilinguals who read the English text, and by bilinguals overall, than by the Japanese monolinguals. The bilinguals appear to restrict the principle that a reflexive can be co-referenced with a long distance topic.

The bilinguals who have read the Japanese text find JQ57 even less acceptable than the monolinguals, reinforcing the rejection of the subject binding.

Possible 2nd language impact

There is no direct equivalent to these sentences in the English questionnaire. If there were, the equivalent to JQ48 would have probably been rejected as going outside the binding domain, while the equivalent to JQ57 would have probably been accepted. JQ48 appears to exhibit a second language effect, its companion JQ57 does not, as the English

equivalent, assuming 'jibun' was translated as 'herself' rather than 'himself', would have been acceptable.

Priming effect: none for JQ57, yes for JQ48.

In English the reflexive can only be bound inside its governing category. The governing category for 'himself' in the examples below is 'Peter', therefore EQ19 and EQ13 below should not be acceptable. The monolinguals reject them, but the bilinguals who had read the English text find them both more acceptable. For EQ19 this is also true for bilinguals overall. The bilinguals appear to relax the rule not allowing cross - reference to the long-range subject.

(36) EQ19. John told Bill that Peter blamed himself.

= John told Bill that Peter blamed John.

(37) EQ13. Mary told Paula that Ann blamed herself.

= Mary told Paula that Ann blamed Mary.

EQ4, in which 'herself' is bound within its governing category (Ann) should be acceptable. The monolinguals agree. While no significant differences are exhibited by EQ34, its duplicate EQ4 has the E/E and the overall bilinguals as less accepting than the other categories. Bilinguals appear to restrict the principle that a reflexive is bound inside its governing category.

(38) EQ4. *Mary told Paula that Ann blamed herself.*

= *Mary told Paula that Ann blamed Ann.*

Possible 2nd language impact

The Japanese monolinguals and their equivalent bilinguals accept JQ16, the equivalent of EQ19 and are split but overall reject JQ10, the equivalent of EQ34. A second language effect appears to be in operation.

Priming effect: none.

Gender and number agreement

According to the literature, 'jibun' can be co-referenced with a subject regardless of gender and number. JQ33 in which 'tachi' has been appended to 'jibun' to indicate the plural, is co-referenced with a subject which is plural (all the students) and is fully acceptable to monolinguals and bilinguals alike.

(39) '*Gakusei - ga mina jibun - tachi - o semeta.*'

student-Nom all self - pl-Acc blamed

All the students blamed themselves.

JQ33. *Gakusei - ga mina jibun - tachi - o semeta.*

JQ41, in which 'jibun' does not have the plural marker, is also expected to be acceptable to the Japanese monolinguals. This is indeed the case, however the bilinguals who have read the Japanese text and the bilinguals overall found JQ41 less acceptable than the Japanese monolinguals, restricting the principle that 'jibun' can be co-referenced with a subject regardless of number.

(40) 'Gakusei - ga mina jibun - o semeta.'

student-Nom all self-Acc blamed

All the students blamed themselves.

JQ41. Gakusei - ga mina jibun - o semeta.

Possible 2nd language impact

In English the reflexive agrees with the binding entity in gender and number. A second language effect may be in operation.

Priming effect: none.

Double possessive

In Japanese the possessive can be expressed solely by preposing the possessor to the possessed. The use of the double genitive makes JQ27 strange and not acceptable to Japanese monolinguals. The bilingual respondents who have read the English text and the bilinguals overall find it more acceptable than their monolingual counterparts, relaxing the rule.

(41) '*John - ga Peter - no jibun - no shashin - o mita.'

John-Nom Peter-Gen self-Gen photograph-Acc saw

John saw Peter's picture of himself.

JQ27. John - ga Peter - no jibun - no shashin - o mita.

Possible 2nd language impact

In English possessive can be expressed by preposing and/or postposing the possessed.

The reflexive must be bound in its binding domain; therefore EQ27, in which ‘himself’ refers to John should be unacceptable, while EQ32 with reference to Peter should be acceptable.

(42) ‘*John_i saw Peter’s_j picture of himself_{Mi/j}.*’

EQ27. John saw Peter’s picture of John.

EQ32. John saw Peter’s picture of Peter.

The Anglophones and their bilingual counterparts judge the two items as expected, showing the bilinguals are clear on the binding domain in English and accept the double genitive.)

Possible 2nd language impact

A second language effect is apparent for the bilinguals filling in the Japanese questionnaire.

Priming effect: yes

Modifiers

In English no modifiers can be applied to anaphors. As expected, the Anglophones reject EQ56.

(43) EQ56. *John saw a new himself in the mirror.*

The bilinguals who have read the Japanese text find EQ56 more acceptable than the Anglophones.

Possible 2nd language impact

A second language effect appears to be in operation.

Priming effect: yes.

In English modifiers can be applied to nouns, so EQ44 should be acceptable. The monolinguals are split, but overall accept it, however it is less acceptable to the bilinguals who had read the English text. This indicates some bilinguals restrict the rule allowing modifiers to be applied to nouns.

(44) EQ44. *John saw a new self in the mirror.*

Possible 2nd language impact

No second language effect appears to be in operation.

Priming effect: none.

4.4.2 Personal pronouns

The monolinguals reject JQ23 and JQ28. This is a strange result for the monolinguals (see also 5.3.1). JQ23 is found more acceptable by all the bilingual categories. Bilinguals who read the Japanese text found JQ28 more acceptable than the monolinguals.

(46) '*John_i - ga Bill_j - ni kare_{i/j} - ga siai - ni katta – to itta.*'

John-Nom Bill-Dat he- Nom game-Dat won-COMP said

John said to Bill that Bill won the game.

JQ23. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni Bill - ga siai - ni katta - to itta.

(47) 'John_i - ga Bill_j - ni kare_{i/j} - ga siai - ni katta - to itta.'

John-Nom Bill-Dat he- Nom game-Dat won-COMP said

John said to Bill that John won the game.

JQ28. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni John - ga siai - ni katta - to itta.

Possible 2nd language impact

The equivalent EQ6 and EQ24 were both found acceptable, reflecting the principle that in English a pronoun must be free inside its governing category but can be bound outside it.

There appears to be a second language effect for both Japanese items.

Priming effect: none.

In English a pronoun must be free inside its governing category, so EQ31 should be unacceptable. The bilinguals who read the English text and the bilinguals overall found EQ31 more acceptable than the monolinguals, thereby relaxing the rule that a pronoun must be free inside its governing category.

(48) EQ31. John talks to Peter about him.

= John talks to Peter about John.

Possible 2nd language impact

Neither monolinguals nor bilinguals accept the Japanese equivalent, JQ26. No second language effect is apparent.

Priming effect: none.

In English it is possible to co-reference a pronoun with a bound variable at LF, as well as with an entity outside the sentence. EQ58 should therefore be acceptable and it was indeed found to be so by the Anglophones. It was, however, found less acceptable by bilinguals who read the Japanese questionnaire and by bilinguals overall. This reflects a narrowing of the principle that in English it is possible to co-reference a pronoun with a bound variable at LF.

(49) EQ58. *Every woman thinks that she is a genius.*

Possible 2nd language impact

The equivalent Japanese was presented as two items with different interpretations. One of them (JQ38) co-referencing with ‘woman’ was found unacceptable, on the other opinions were split but overall it was considered acceptable. This reflects the principle that in Japanese it is not possible to co-reference an anaphora with a bound variable at LF, whereas in English it is. There appears, therefore, to be a second language effect.

Priming effect: yes.

In Japanese it does not appear feasible to co-reference the pronoun with the nearest subject in the sentence, so JQ35 should not be more than marginally acceptable.

(50) *'*Mary_i - ga shiken-ni ochi-ta node, kanozyo_i - wa totemo zannengat-ta.'*

Mary-NOM test-DAT fail-PAST because she-TOP very regret-PAST

'Because Mary_i failed the test, she_j was very unhappy.'

JQ35. Mary - ga shiken-ni ochi-ta node, kanozyo - wa totemo zannengat-ta.

= Mary - ga shiken-ni ochi-ta node, Mary - wa totemo zannengat-ta.

It is in fact found acceptable by the monolinguals but less so by bilinguals who have read the English text.

Possible 2nd language impact

The English equivalent item is presented without an interpretation and is found acceptable by all concerned. No second language effect appears to be operative.

Priming effect: none.

Pro-drop

pro-drop is acceptable in Japanese. The Japanese monolinguals are split over JQ60, but accept it overall. The bilinguals who have read the English text find it less acceptable, restricting the principle that pro-drop is acceptable in Japanese.

(51) *'John - ga tensai-da to omotte-iru.'*

John-NOM 'pro' genius-COP COMP think-PRES

John thinks (he) is a genius.

JQ60. John - ga tensai-da to omotte-iru.

Possible 2nd language impact

pro-drop is not acceptable in English. There is no example in the questionnaire. A second language effect may be in operation.

Priming effect: none.

Ellipsis facts

Two types of elided clauses were examined. The first:

(52) John defends himself better than Paul.

has three possible interpretations in English, but the only one on which the Anglophones are in agreement is the so-called ‘sloppy’ interpretation:

(53) EQ18. John defends John better than Paul defends Paul.

Both Anglophones and bilinguals accept this interpretation. The equivalent Japanese statement is supposed to have only two acceptable interpretations, the ‘sloppy’ one and the object comparison one. Japanese monolinguals and bilinguals both accept the ‘sloppy’ interpretation and reject any others.

EQ30, the ‘*object comparison*’ interpretation,

(54) EQ30. Peter defends himself better than Paul.

= Peter defends himself better than Peter defends Paul.

appears to be less acceptable to the bilinguals who have read the Japanese text (the monolinguals of both languages are split but find it overall unacceptable). The duplicate of EQ30, EQ14, shows no significant difference between bilinguals and monolinguals, who all find it unacceptable

Possible 2nd language impact

A second language effect may be in operation.

Priming effect: none.

The second type of elided clause:

(55) John defends Mary better than Peter.

is supposed to have two acceptable interpretations in English (subject and object), but only one in Japanese (object JQ19). The construction exhibits significant differences in Japanese between monolinguals and bilinguals.

(56) 'Peter defends Mary better than Paul.

= Peter defends Mary better than Paul defends Mary.'

JQ21. Peter - wa Paul yori Mary - o umaku bengosuru.

= Peter - wa Paul -ga Mary - o bengosuru yori umaku Mary - o bengosuru.

'Peter defends Mary better than Paul.'

= Peter defends Mary better than Peter defends Paul.'

JQ19. Peter - wa Paul yori Mary - o umaku bengosuru.

= Peter - wa Paul - o bengosuru yori umaku Mary - o

Bilinguals who have read the English text find the JQ19 more acceptable than monolinguals, JQ21 less so.

Possible 2nd language impact

The English equivalent for JQ19 is acceptable, so a second language effect appears to be in operation. The one for JQ21 is largely unacceptable; no second language effect appears to be operational.

Priming effect: none for JQ21, yes for JQ19.

4.5 Eliminating issues which might distort the collected data

A number of issues were identified as capable of distorting the results of the experiment, such as item order, dialect, active age, current age, and untypical bilinguals. Specific tests were carried out to identify and/or avoid possible distortions. To avoid any possible dialect impact, only Japanese monolinguals from Tokyo were used (the bilinguals were all from Tokyo). The Anglophones came mainly from Delaware with a sprinkling of Maryland and Philadelphia. It was assumed this will give homogeneity to the English data and this seemed to have been the case (see next subchapter for details). Active age, the age by which a bilingual had started using both English and Japanese for normal communicative processes, was set at a maximum of 6. An attempt was made to define

what is a true bilingual and tests rerun for the subset of bilinguals so identified. None of these factors appear to have distorted the core of the results, i.e. bilinguals have two separate sets of rules, largely identical to the respective monolinguals.

4.5.1 Impact of item order

One group of monolingual respondents was given the questionnaire in the forward direction, another one in reverse. This was done in order to check whether the order in which items were presented had a significant impact on the responses. No such impact was found. Out of 11 items involved in total, only JQ27 and JQ57 exhibit a significant difference between monolinguals and bilinguals that could disappear as a result of a comparison against the questionnaire administered in reverse.

English questionnaire

18 respondents from Delaware were given the English questionnaire in the normal order, 13 in reverse, i.e. the last example, EQ3, was followed by EQ60.

Two items exhibited significant differences as per the Mann-Whitney U tests. In both cases all the respondents find the items acceptable as expected, the respondents to the reverse questionnaire more so than their counterparts.

(57) *'Because Mary_i failed the test, she_i was very unhappy.'*

EQ38. Because Mary failed the test, she was very unhappy.

'Mary_i thinks that she_i is a genius.'

EQ52. Mary thinks that she is a genius.

Japanese questionnaire

27 respondents from Waseda University were given the Japanese questionnaire in the normal order, 32 in reverse, i.e. the last example, JQ3, was followed by JQ60. 9 items exhibited significant differences as per the Mann-Whitney U tests.

JQ17 is supposed to be unacceptable. The forward respondents find it so, the reverse ones are split and find it overall more acceptable than their counterparts.

(58) 'Mary_i - wa Bill_j - ni jibun_i/*_j - no uchi de hon-o yoma-sa-re-ta.'

Mary-Top Bil-DAT self-GEN house in book-ACC read-cause-passive-past

JQ17. Mary was made by Bill to read the book in Bill's house.

JQ18 is supposed to be acceptable. The forward respondents are split; the reverse ones are fairly unanimous and find it overall more acceptable than their counterparts.

(59) 'Mary_i - wa Bill_j - ni jibun_i/_j - no kazoku-no hanashi bakari sa-re-ta.'

Mary-Top Bil-DAT self-GEN family-GEN talk only do-passive-past

JQ18. Mary was affected by Bill's talking only about Bill's family.

JQ27 is supposed to be unacceptable. The forward respondents find it so, the reverse ones too, but find it overall more acceptable than their counterparts.

(60) '*John - ga Peter - no jibun - no shashin - o mita.'

John-NOM Peter-GEN self-GEN photograph-ACC saw

JQ27. John saw Peter's photograph of himself.

JQ43 is supposed to be unacceptable. The forward respondents find it so; the reverse ones split and find it overall more acceptable than their counterparts.

(61) ‘**Jidosha - ga jibun - no syako -no hoo - e hasiridashita.*’

car-NOM self-GEN garage-GEN direction-to began to run

JQ43. The car began to move to self's garage.

JQ44 is supposed to be acceptable. The forward respondents are split; the reverse ones are split too, but find it overall more acceptable than their counterparts.

(62) ‘*Mary_i - ga kanozyo_{ij} - ga tensai-da to omotte-iru.*’

Mary-NOM she-NOM genius-COP COMP think-PRES

JQ44. Mary thinks (Mary) is a genius.

JQ45 is supposed to be acceptable. The forward respondents agree, the reverse ones agree too, but find it overall more acceptable than their counterparts.

(63) ‘*Dono dansei_i - mo jibun_i - ga eiyuu-da to omotte-iru.*’

Every man-also himsef-NOM hero-COP COMP think-PRES

JQ45. Every man thinks he is a hero.

JQ46 is supposed to be acceptable. All respondents are split; the reverse ones find it overall more acceptable than their counterparts.

(64) ‘*John - to Paul_j -wa tomodachi da. John_i - ga jibun_{ij} - ga tensai-da to omotte-iru.*’

John-NOM he-NOM genius-COP COMP think-PRES

JQ46. John and Paul are friends. John thinks (John) is a genius.

JQ51 is supposed to be marginally acceptable. The forward respondents find it so, the reverse ones are split and find it overall less acceptable than their counterparts.

(65) *Jibun - ni kansuni hon - ga Mary - no miine - o ut - ta.*

' That book about herself struck Mary as embarrassing. hit heart

JQ51. That book about herself struck Mary as embarrassing

JQ57 is supposed to be acceptable. The forward respondents disagree, the reverse ones disagree too and find it overall less acceptable than their counterparts.

(66) *John_i - wa Mary_j - ga jibun_{i/j} - o aisite iru koto - o sitte ita. '*

Jhn-topic Mary-NOM self-ACC is loving that knowing was

JQ57. John knew that Mary loves herself

No pattern has been identified.

4.5.2 Age Impact

Overall, with the exception of EQ21, which they find less acceptable, younger bilinguals tend to find items more acceptable than their older counterparts. With the exception of EQ21, bilinguals and monolinguals judge all the other items involved the same way.

Current age impact

A number of comparisons were carried out between the responses of different groups of bilinguals (separated by their current age) to see whether actual age made an impact on

the responses. Unless otherwise specified, to avoid ending up with groups which are too small, the entire bilingual data set was used, i.e. not only those who started using both languages for normal communicative purposes before the age of 7. An overall tendency of younger respondents to be more willing to accept given constructions was apparent in most of the comparisons undertaken.

Teens effect

The teens from ASIJ, most of which were Nishimachi graduates, seemed to have some difficulty settling down, so the question arose whether their answers would differ drastically from those of the Nishimachi respondents due to either 'teens attitude' or improved mastery of this area of language.

ASIJ students filled Japanese questionnaires preceded by an English text. Their responses were removed and the remaining set was compared to the Japanese monolinguals both for the full set and for the reduced set (active age less than 7). The number of significantly different items changed marginally. The effect on the bilinguals taken as a whole was minimal.

Similar effects were observed for ASIJ students who filled in an English questionnaire having read an English or a Japanese text.

Nishimachi age groups Japanese questionnaire

12 Nishimachi students aged 11 to 12 and 11 students aged 13 to 15 filled in the Japanese questionnaire preceded by a Japanese text. When the answers were compared against each other, 6 items (JQ4, JQ24, JQ36, JQ51, JQ58, JQ59) exhibited significant differences, 5 of which were found more acceptable by the younger group (the exception being JQ58). The cross-tab results indicate that the responses of the older group are nearer the responses of the monolinguals for 5 out of 6 items (the exception being JQ59). This could mean that the use and interpretation of anaphora crystallises around age 13 and that before that there is more flexibility.

Nishimachi older students/ASIJ groups

11 Nishimachi students aged 13 to 15 and 8 ASIJ students aged 18 to 19 filled in a Japanese questionnaire preceded by an English text. 4 items (EQ7, EQ14, EQ21 and EQ37) exhibited significant differences; the younger students, with the exception of EQ21, found the items more acceptable. All four items are considered fully acceptable by the monolinguals.

Nishimachi age groups English questionnaire

6 students in the younger group and 8 in the older group filled in an English questionnaire preceded by an English text. The younger students found all the 4 items that exhibited significant differences more acceptable than the older ones. The monolinguals are split on 3 out of the 4 items.

Active Age Impact

Some recent research in the area of maturation effects on bilinguals (Hyltenstam 2000) indicates that even age 6 may be late in terms of starting to use a second language actively. Splitting the four bilingual groups into active age brackets of 0-3 and 4-6 resulted in too few entries in most groups for statistical analysis purposes. This is something that could be checked in future experiments.

4.5.3 A 'typical' bilingual

An attempt was made to define a typical monolingual and to check whether the bilinguals in the experiment fell into that category. This was done by working out the mean and standard deviation for every item in the Waseda and the Delaware forward groups. For every bilingual the first and third quartiles were calculated.

In the first quartile all the numbers were negative, in the 3rd more than 50% were negative for the bilinguals who filled a Japanese questionnaire, more than 60% for the ones who filled an English questionnaire. This seems to indicate bilinguals overall tend to judge the items presented as less acceptable than their respective monolinguals. This matches the indications from the analyses of significant differences in results carried out using the Mann Whitney tests.

For every bilingual the items which least and most differed from the norm (scaled deviation) were identified. No patterns were recognisable across either of the bilinguals' sets.

In the quartile analyses, if a bilingual fell outside the -1.8 to 1.8 bracket in terms of the scaled deviation, he/she was considered as not falling within the norm. Out of 37 bilinguals who started using both their languages for normal communicative purposes by or before the age of 6, and who answered to the Japanese questionnaire, 8 fell outside the norm. This was also the case for 6 out of the 26 bilingual respondents to the English questionnaire. The bilinguals who fell outside the norm were removed from the data set and the chi-square and the Mann Whitney tests rerun. The variation in results from the ones analysed in 4.5 and 4.5/4.3 are examined below. Overall, some bilinguals responding to the Japanese questionnaire were less clear on the use of the reflexive as a possessive, on empathy or co-reference with animate/inanimate and appeared open to some ambiguous interpretations. The bilinguals responding to the English questionnaire were relatively more willing to accept binding a pronoun within its GC, but overall still rejected the construction. This still leaves a large number of constructions for which the bilinguals agree with their respective monolinguals, but which are different in the two languages or non-existent in one of them, pointing to the fact that the bilinguals have separate rules for their languages.

Not only did eliminating the 'bad' bilinguals not result in the elimination of the differences between monolinguals and bilinguals, it added some more, indicating these differences are deep seated.

Effect on constructions previously found not to exhibit significant differences between monolinguals and bilinguals

The subsections below list the significant differences between monolinguals and bilinguals, after the elimination of 'bad' bilinguals in the constructions that, prior to the elimination exhibited no significant differences.

Japanese questionnaire

A number of items (JQ12, JQ36, JQ39, EQ15) now exhibit significant differences as outlined below.

- (67) *'Mary_i - wa Bill_j - ni jibun_{i/j} - no kazoku-no hanashi bakari sa-re-ta.'*
Mary-Top Bil-DAT self-GEN family-GEN talk only do-passive-past
Mary was affected by Bill's talking only about self's family.

JQ12. Mary was affected by Bill's talking only about Mary's family.

JQ18. Mary was affected by Bill's talking only about Bill's family.

JQ12, with the subject oriented binding is rejected by monolinguals but found more acceptable by bilinguals who read the Japanese text, while JQ18, featuring the object orientation, is accepted by both categories. This implies that in the case of a psych verb some bilinguals are willing to accept co-referencing with the subject as well as the logical subject in object position.

In Japanese there are a number of verbs for give/take representing various scales of empathy. 'jibun' can link some but not others. This has no equivalent in English. The

Japanese monolinguals accept JQ42 and reject JQ36 as expected. All bilinguals accept JQ42. The bilinguals who read the Japanese text are split on JQ36 and find it overall more acceptable than their monolinguals, indicating they are a little shaky on the impact of empathy.

(68) *'John_i - wa Peter -ga jibun_i - ni kasite kureta hon - o nakusite simatta.'*

*'*John_i - wa Peter -ga jibun_i - ni kasite yatta hon - o nakusite simatta.'*

John-Top Peter-NOM self-to lending gave book-ACC losing ended up

JQ42/JQ36. John has lost a book that Peter has lent him.

In Japanese anaphora can refer to an animate, but not an inanimate object JQ39 versus JQ43.

(69) *'Kodomo ga jibun no uchi e hasitte itta'*

child NOM self GEN home to run went

JQ39. The child run to self's house.

(70) *'*Jidosha - ga jibun - no syako -no hoo - e hasiridashita.'*

car-NOM self-GEN garage-GEN direction-to began to run

JQ43. The car began to move to self's garage.

The monolinguals perform as expected. The bilinguals are in agreement with their monolingual counterparts, exercising the same judgement in phi features, except for those who read the Japanese text who find JQ39 overall acceptable, but less so than the monolinguals.

English questionnaire

The following family of items had no equivalent in the Japanese questionnaire. The monolinguals and the bilinguals were in full agreement, accepting that a pronoun must be free inside its governing category, accepting EQ11 and EQ29 and rejecting EQ15. The bilinguals who read the Japanese text found EQ15 unacceptable, but not to the same extent as the monolinguals.

(71) 'John_i told Bill_j that Peter_k blamed him_{i/j/*k}.'

EQ11. John told Bill that Peter blamed him.

= John told Bill that Peter blamed John.

EQ29. John told Bill that Peter blamed him.

= John told Bill that Peter blamed Bill.

EQ15. John told Bill that Peter blamed him.

= John told Bill that Peter blamed Peter.

Effect on constructions exhibiting significant differences between monolinguals and bilinguals

The subsections below list the additional significant differences between monolinguals and bilinguals after the elimination of 'bad' bilinguals in the constructions that, prior to the elimination exhibited significant differences.

Japanese questionnaire

An additional level of confusion is added to the ellipsis items for the Japanese questionnaire. The bilinguals who read the Japanese text and the bilinguals overall find JQ25 less acceptable than the monolinguals. Those who read the English text find JQ30 more acceptable than the monolinguals.

(72) *'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'*

Peter-TOP Paul-COMP self-ACC defends

JQ25. Peter defends Paul better than Paul defends Paul

JQ30. Peter defends Peter better than Peter defends Paul

English questionnaire

All the additional items exhibiting significant differences reinforce already existing differences (EQ13, EQ31).

In English the reflexive can only be bound inside its governing category. The governing category for 'himself' in the examples below is 'Peter', therefore EQ19 and EQ13 below should not be acceptable. The monolinguals reject them, but they are both found more acceptable by the bilinguals who had read the English text and bilinguals overall. The bilinguals appear to relax the rule not allowing cross - reference to the long-range subject.

(73) *EQ19. John told Bill that Peter blamed himself.*

= John told Bill that Peter blamed John.

(74) EQ13. *Mary told Paula that Ann blamed herself.*

= *Mary told Paula that Ann blamed Mary.*

In English, a pronoun must be free inside its governing category, so EQ31 should be unacceptable. All the classes of bilinguals found EQ31 more acceptable than the monolinguals, thereby relaxing the rule that a pronoun must be free inside its governing category.

(75) EQ31. *John talks to Peter about him.*

= *John talks to Peter about John.*

4.5.4 Response bias

Another possible factor that could distort the results would be a response bias, in other words Japanese monolinguals or Anglophones could exhibit a tendency for either extreme responses, or for middle-of-the-road responses. The following graph shows the distribution of responses for the Waseda and the Delaware monolinguals that were administered the questionnaire in the forward direction. Although there is more of a tendency for Anglophones to fully accept some statements, this may be linked to the Japanese monolinguals' rejection of ambiguity.

Response Distribution

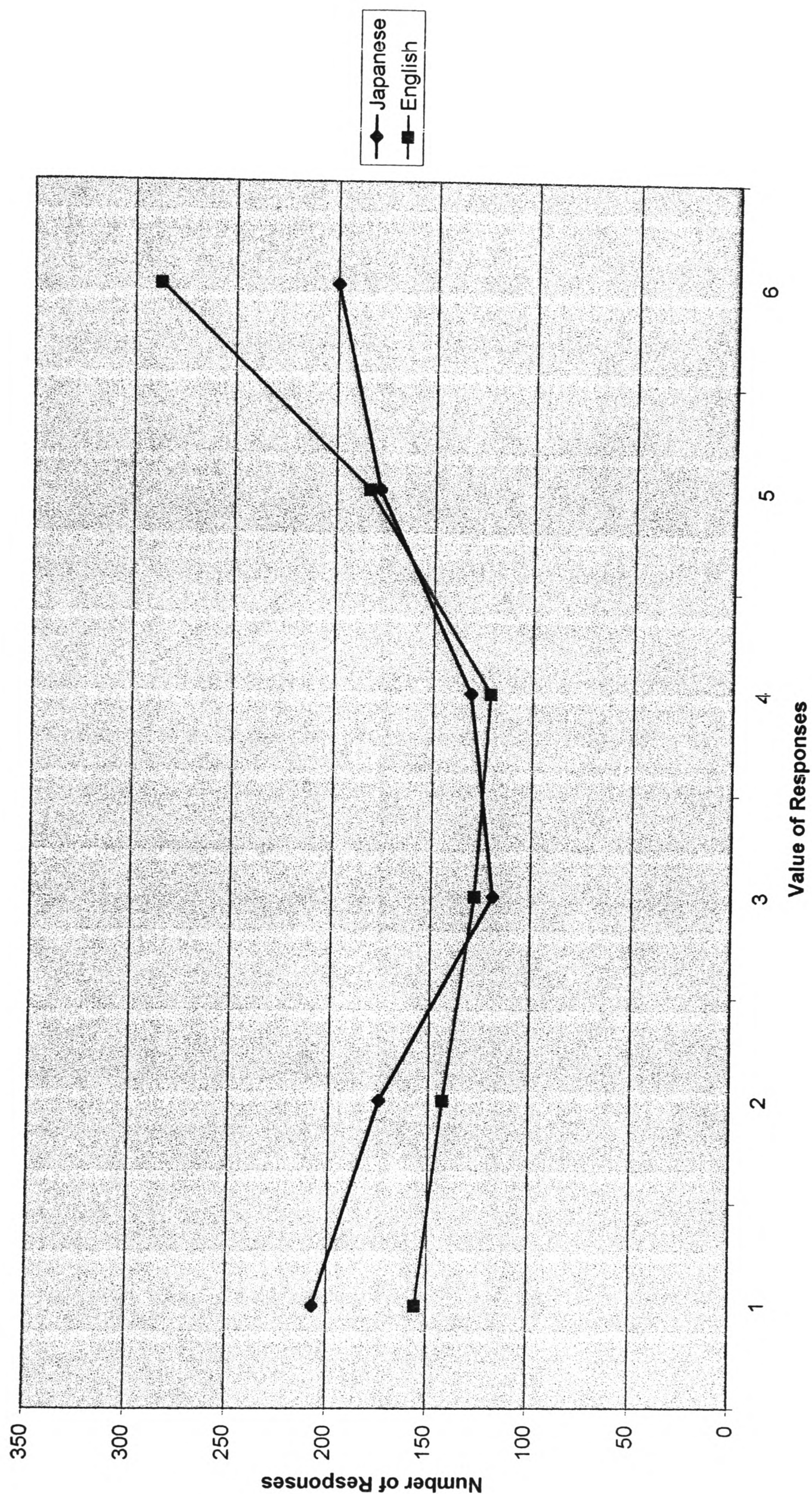


Figure 4.1 Response distribution

4.6 And never the twain shall meet

The monolinguals' responses are not always in line with the expectations set up by the literature, nor do they always agree with each other.

Out of a total of 57 items, there are 7 items the Anglophones judge the opposite way to expectations, 6 of which they reject. These figures go up to 17 and 16 respectively for the Japanese monolinguals.

Out of the 57 items in the Japanese questionnaire and 57 in the English; 14 (23%) and 18 (30%) respectively elicited inconsistent answers from monolinguals (i.e. the monolinguals disagreed with each other). The Japanese monolinguals found 10 items less acceptable than expected, one more so. The remaining 3 items were reversals, i.e. what is deemed to be acceptable is rejected by the respondents. The Anglophones found 7 items less acceptable than predicted by the theory (2 of which to do with ellipsis); out of the remaining 11, 4 are reversals (two to do with ellipsis), and 7 more acceptable than predicted.

'A' denotes either that the construction is deemed acceptable in the literature, or that in actuality 67% or more of respondents have judged it acceptable (4 to 6 on a scale of 1 to 6). 'N' denotes either that the construction is deemed unacceptable in the literature, or that in actuality 67% or more of respondents have judged it unacceptable (1 to 3 on a scale of 1 to 6). 'M' denotes a construction considered marginally acceptable in the literature and/or by the Japanese or English linguists consulted.

4.6.1 Actual versus expected

English questionnaire

There are six items that the Anglophones are supposed to find acceptable but do not, and one for which the reverse occurs. The bilinguals' responses exhibit no statistically significant differences from the monolinguals'.

ITEM	EXPECTED	ACTUAL
EQ9. John talked to Bill about himself. = John talked to Bill about Bill.	A	N
EQ23. Mary talked to Ann about herself. = Mary talked to Ann about Ann.	A	N,A
EQ17. John showed Bill a picture of himself. = John showed Bill a picture of Bill.	A	N,A
EQ7. Peter defends himself better than Paul. = Peter defends himself better than Paul defends Peter.	A	N,A
EQ30. Peter defends himself better than Paul. = Peter defends himself better than Peter defends Paul.	A	N,A
EQ14. Mary defends herself better than Ann. = Mary defends herself better than Mary defends Ann.		
EQ43. John depresses himself.		

EQ9, EQ23 and EQ17 indicate an inclination to choose the subject as the likeliest antecedent. Note this does not happen when the two possible antecedents are of different genders. (see EQ55 and EQ56, both of which accept the object binding as well formed).

EQ7, EQ30 and EQ14 indicate a difficulty in hearing some interpretations of elided constructions.

EQ43 indicates that contrary to expectations (see Chapter 2) Anglophones accept binding to both *fear* and *frighten* type verbs.

Japanese questionnaire

The monolinguals judge 17 items in the opposite way to that expected. With the exception of two cases (EQ21 and JQ19), they reject items deemed acceptable in the literature and/or by my two informants, Japanese linguists at Oxford University. The bilinguals' responses exhibit no statistically significant differences from the monolinguals', with the exception of JQ19, JQ27, JQ28 and JQ23, that one or more category of bilinguals find significantly more acceptable, JQ21 found less acceptable by the bilinguals who had read the English priming text, and JQ57 that is found even less acceptable by the bilinguals who had read the Japanese priming text.

One of the items under consideration, JQ27, refers to the use of the double genitive allowable in English, but not in Japanese. 7 items involve the use of personal pronouns, which appear to be far less acceptable to the respondents than expected. In fact, out of the 5 families, including personal pronouns, the monolinguals reject three in their entirety: JQ28, JQ23; JQ26, JQ5; and JQ44, JQ55. We have not been able to propose an explanation for this, other than speculate that the monolinguals are, indirectly, expressing their preference for the use of '*jibun*'.

The 7 remaining items all using '*jibun*', JQ12, JQ10, JQ53, JQ46, JQ30, JQ57, and JQ52 all appear to indicate a refusal on the part of Japanese monolinguals to allow potentially ambiguous statements to be interpreted in more than one way (the other interpretation for each statement was found acceptable). With the exception of JQ35, which is found acceptable and its counterpart JQ47, which is found acceptable by 50% of the monolinguals (involving the use of personal pronouns), no ambiguity is accepted by the Japanese monolinguals in the overall data set.

ITEM

Mary was affected by Bill's talking only about Mary's family. A N

JQ12. Mary - wa Bill - ni jibun - no kazoku-no hanashi bakari sa-re-ta.

= Mary - wa Bill - ni Mary - no kazoku-no hanashi bakari sa-re-ta.

John said to Bill that Peter blamed Peter. A N,A

JQ10. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga Peter - o semeta - to itta.

John saw Peter's photograph of himself. M N

JQ53. John - ga watashi - no jibun - ni kansuru hanashi - o kiniit - ta.

= John - ga watashi - no John - ni kansuru hanashi - o kiniit - ta.

Peter defends Mary better than Paul (defends Mary). N A

JQ21. Peter - wa Paul yori Mari - o umaku bengosuru.

= Peter - wa Paul -ga Mari - o bengo suru yori umaku Mari - o bengosuru.

John knew that Mary loves herself. A N

JQ57. John - wa Mary - ga jibun - o aisite iru koto - o sitte ita.

= John - wa Mary - ga Mary - o aisite iru koto - o sitte ita.

The fact that Mary did not love herself distressed John. A N

JQ52. Mary - ga jibun - o aisite inai koto - ga John - o gakkari-sase-ta.

= Mary - ga Mary - o aisite inai koto - ga John - o gakkari-sase-ta.

A: Is it that someone went to the party instead of John? A N,A

B: No, it is by self that came.

JQ32. A: Dareka - ga John - no kawari - ni sono party - ni itta - ndesu - ka.

B: Iie, jibun - de kita - ndesu.

JQ27. John - ga Peter - no jibun - no shashin - o mita.

John likes my stories about himself. M N

John and Paul are friends. John thinks John is a genius. A N,A

JQ46. John - to Paul -wa tomodachi da. John- ga jibun - ga tensai-da to omotte-iru

= John - ga John - ga tensai-da to omotte-iru.

John said to Bill that John won the game. A N

JQ28. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni John - ga siai - ni katta - to itta.

John said to Bill that Bill won the game. A N

JQ23. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni Bill - ga siai - ni katta - to itta.

John spoke to Peter about John. A N

JQ26. John - ga Peter - ni kare - ni tsuite hanashita.

= John - ga Peter - ni John - ni tsuite hanashita.

John spoke to Peter about Peter.	<i>A</i>	<i>N</i>
JQ5. John - ga Peter - ni kare - ni tuite hanashita.		
= John - ga Peter - ni Peter - ni tuite hanashita.		
<i>Mary thinks that Mary is a genius.</i>	<i>A</i>	<i>N</i>
JQ44. Mary - ga kanozyo - ga tensai-da to omotte-iru.		
= Mary - ga Mary - ga tensai-da to omotte-iru.		
<i>Mary thinks that Mary's mother is a genius.</i>	<i>A</i>	<i>N</i>
JQ55. Mary - ga kanozyo - ga tensai-da to omotte-iru.		
= Mary - ga Mary - no okaasan - ga tensai-da to omotte-iru		
Peter defends himself better than (Peter defends) Paul.	<i>A</i>	<i>N,A</i>
JQ8. Peter -wa Paul yori jibun - o umaku bengosuru.		
= Peter -wa Paul - o bengo suru yori jumaku jibun - o bengosuru.		
<i>Peter defends Mary better than Paul (defends Paul).</i>	<i>A</i>	<i>N,A</i>
JQ19. Peter - wa Paul yori Mari - o umaku bengosuru.		
= Paul - o bengo suru yori Mary - o umaku bengosuru.		

Summary

The table below is a variation of the table in Chapter 2 showing the expected rules of Japanese and English. Where the result is different from the one expected this is marked in italics. The numbers identify the items in question, for example 27 in the English column refers to EQ27. ‘d’ following a number indicates that this item is identical to

another item with the exception of some lexical items used. This convention is also used in other tables appearing later in the section.

Characteristics of anaphora	English	Japanese
Double genitive allowed	Yes 27,32	No 27
binding in the governing category mandatory	Yes (57,48)	No (53,58)
long distance reflexives used <i>no ambiguity allowed in Japanese</i>	No 15,13d, 25,21d, 34,4d	Yes 16,20,10
no antecedent constructions acceptable (but of different types) <i>no ambiguity allowed in Japanese</i>	Yes 45,54	Yes 32,46,54
modifiable anaphors	No 56,44	Yes 40
gender, person and number agreement with antecedent mandatory	Yes 56	No 33,41
the antecedent of the reflexive must be animate	No 50	Yes 39,43
the reflexive can occupy the embedded subject position	No 10,36 51	Yes 14,6 31

the reflexive can occupy the possessive position	No	Yes 34
strong preference for a subject antecedent <i>no ambiguity allowed in some English constructions, in such cases subject antecedent only one accepted</i>	No 5,16d,9 ,23d, 8,12d, 17 46	Yes 7,15 9,13 picture np 48,57
counter example: direct passive unambiguous	N/A	Yes 11,17
indirect passive ambiguous <i>no ambiguity allowed</i>	N/A	Yes 12,18
non-agentive causative + backward binding	N/A 41,51	Yes 37,31
Reflexive can be construed as bound variable at LF	No	Yes 45
empathy	No	Yes 42,36
acceptable 'subject comparison' interpretation of elided clauses: 2 ways <i>accepted in Japanese</i> 3 ways <i>not accepted in English</i>	Yes 22 7	No 21 30

Acceptable ‘object comparison’ interpretation of elided clauses	Yes	Yes
2 ways <i>not acceptable in duplicate example in English, not acceptable in Japanese</i>	33,26d	19
3 ways <i>not acceptable in English</i>	30	8
Acceptable ‘sloppy’ interpretation of elided clauses	Yes	Yes
3 ways only	18	25
acceptable use of pronouns as anaphors	No	Yes
<i>no acceptable version in Japanese</i>	31,37, 28	26,5
Personal pronouns construed as bound variable at LF	Yes	No
	58	38,22
Personal pronouns co-referenced with proper name	Yes	Yes
<i>no acceptable version in Japanese</i>	52	44,55
pro-drop	No	Yes
		60

Table 4.1 Actual and expected rules for Japanese and English

4.6.2 The disagreeing monolinguals

English questionnaire

At least 33% of the monolinguals disagree with the majority on the 18 items below. With two exceptions (EQ30 which the bilinguals who read the Japanese priming text find significantly less acceptable than the monolinguals, and EQ44 which the bilinguals who read the English priming text find significantly less acceptable than the monolinguals), the bilinguals' responses exhibit no statistically significant differences from the monolinguals'.

The first four items in the table below appear also in 4.6.1 as items that are found unacceptable, contrary to expectations. Otherwise, at least 50% of monolinguals but less than 67% agree with the expected judgement. The list below contains 4 of the 7 ellipsis items, 3 of the 6 exhibiting backward binding and 2 of the 4 with no antecedent.

ITEM

EQ23. Mary talked to Ann about herself.	A	N,A
= Mary talked to Ann about Ann.		
EQ7. Peter defends himself better than Paul.	A	N,A
= Peter defends himself better than Paul defends Peter.		
EQ30. Peter defends himself better than Paul.	A	N,A
= Peter defends himself better than Peter defends Paul.		
EQ17. John showed Bill a picture of himself.	A	N,A
= John showed Bill a picture of Bill.		

EQ33. Peter defends Mary better than Paul.	A	A,N		
= Peter defends Mary better than Peter defends Paul.				
EQ26. Mary defends Paula better than Ann.	A	A=N		
= Mary defends Paula better than Mary defends Ann.				
EQ10. John told Bill that himself won the game.	N	N,A		
= John told Bill that John won the game.				
EQ27. John saw Peter's picture of himself.	N	A,N		
= John saw Peter's picture of John.				
EQ57. John likes my stories about himself.	N	N,A		
EQ37. John talks to Peter about him.	N	N,A		
= John talks to Peter about Peter.				
EQ11. John told Bill that Peter blamed him.	A	A,N		
= John told Bill that Peter blamed John.				
EQ35. John saw Peter's picture of him.	N	N,A		
= John saw Peter's picture of Peter.				
EQ39. Stories about herself amused my sister.	A	A,N		
EQ49. That book about herself struck Mary as embarrassing.			A	A,N
EQ42. That book about herself struck Mary on the head.	N	N,A		
EQ54. Was it John who went to the party ?	M	A,N		
No, it was myself.				
EQ53. People like himself are always drinking coffee.	N	A,N		
EQ44. John saw a new self in the mirror.	A	A,N		

Japanese questionnaire

The monolinguals are split for 14 items, three of which appear in 4.6.1.2 as being rejected contrary to expectation. (JQ10, JQ46, and JQ32) With two exceptions (JQ19 which the bilinguals who read the English priming text find significantly more acceptable than the monolinguals, and JQ60 which the bilinguals who read the English priming text find significantly less acceptable than the monolinguals), the bilinguals' responses exhibit no statistically significant differences from the monolinguals'. In all cases, at least 33% of monolinguals reject the 12 items supposed to be acceptable.

ITEM

Mary was made by Bill to read the book in Mary's house. A A,N

JQ11. Mary - wa Bill - ni jibun - no uchi de hon-o yoma-sa-re-ta.

= Mary - wa Bill - ni Mary - no uchi de hon-o yoma-sa-re-ta.

Mary was affected by Bill's talking only about Bill's family A A=N

JQ18. Mary - wa Bill - ni jibun - no kazoku-no hanashi bakari sa-re-ta.

= Mary - wa Bill - ni Bill - no kazoku-no hanashi bakari sa-re-ta.

John said to Bill that Peter blamed Peter. A N,A

JQ10. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga Peter - o semeta - to itta.

John likes my stories about myself. A A,N

JQ58. John - ga watashi - no jibun - ni kansuru hanashi - o kiniit - ta.

= John - ga watashi - no watashi - ni kansuru hanashi - o kiniit -ta.

John and Paul are friends. John thinks John is a genius. A N,A

JQ46. John - to Paul -wa tomodachi da. John- ga jibun - ga tensai-da to omotte-iru.

= John - ga John - ga tensai-da to omotte-iru.

Every woman thinks Mary is a genius. A A,N

JQ22. Dono zyosei - mo kanozyo - ga tensai-da to omotte-iru.

= Dono zyosei - mo Mary - ga tensai-da to omotte-iru.

Because Mary failed the test, Mary's mother was very unhappy. A A=N

JQ47. Mary - ga shiken-ni ochi-ta node, kanozyo - wa totemo zannengat-ta.

= Mary - ga shiken-ni ochi-ta node, Mary - no okaasan - wa totemo zannengat-ta.

Peter defends himself better than (Peter defends) Paul. A N,A

JQ8. Peter -wa Paul yori jibun - o umaku bengosuru.

= Peter -wa Paul - o bengo suru yori jumaku jibun - o bengosuru.

Peter defends Mary better than Paul (defends Paul). N N,A

JQ19. Peter - wa Paul yori Mari - o umaku bengosuru.

= Paul - o bengo suru yori Mary - o umaku bengosuru.

That book about herself struck Mary on the head. (fell) A A,N

JQ56. Jibun - ni kansuru hon - ga Mary - no atami - ni ochi - ta.

The fact that (he) himself is a fool saddened John. A A,N

JQ49. Jibun - ga baka na koto-ga John-o kanasima-se-ta.

The fact that Mary did not love himself distressed John. A A,N

JQ59. Mary - ga jibun - o aisite inai koto - ga John - o gakkari-sase-ta.

= Mary - ga John - o aisite inai koto - ga John - o gakkari-sase-ta.

A: Is it that someone went to the party instead of John? A N,A

B: No, it is by self that came.

JQ32. A: Dareka - ga John - no kawari - ni sono party - ni itta - ndesu - ka.

B: Iie, jibun - de kita - ndesu.

John thinks (he) is a genius.

A A,N

JQ60. John - ga tensai-da to omotte-iru.

4.7 Comparing bilinguals and monolinguals: summary

There were a total of 57 items each in the Japanese and the English questionnaire, excluding the three training items per questionnaire. The bilingual respondents to the Japanese questionnaire exhibited significant differences from their monolingual counterparts in 11, 7 of which they judged as being less acceptable. The bilingual respondents to the English questionnaire found 4 items significantly less acceptable than the Anglophones and 6 significantly more acceptable. Overall, in 15 out of 21 items, the bilinguals veer towards a middle position (they judge the item or its interpretation as less acceptable if the monolinguals find it acceptable and more acceptable if the monolinguals find it unacceptable). This is also the case for all the items but one (EQ6), where significant differences are exhibited by two or more categories of bilinguals. The bilinguals' answers to 7 items in the English questionnaire, 9 in the Japanese (16 out of 21) appear to indicate an impact from the bilinguals' second language.

Some of the significant differences encountered do not appear to add anything to the analysis, i.e. in some circumstances they indicate an additional degree of rejection to a construction rejected by the monolinguals.

4.7.1 Constructions: no significant differences

There are a number of constructions that differ between Japanese and English or exist in one language and not the other, for which the bilinguals' responses do not show statistically significant responses from those of the monolinguals. These are summarised below. Their existence indicates that the bilinguals have two sets of rules for their two languages.

In the table, REF stands for the item number in question in the Japanese (JQ) or the English (EQ) questionnaire. The item in the Japanese questionnaire is always followed by the item in the English questionnaire when available. EXP refers to whether the item is expected to be acceptable (A), marginal but acceptable (M), or not acceptable (N). ACT reflects the answers given by the monolinguals, acceptable (A), not acceptable (N) and split (N, A or A, N).

REFLEXIVES

CONSTRUCTION	REF	EXP	ACT	COMMENT
Inanimate antecedent	JQ43	N	N	Acceptable in English but not in Japanese
	EQ50	A	A	
Reflexive in subject position	JQ45	A	A	Acceptable in Japanese but not

with bound variable reading				in English; reflexive can't occupy subject position (no equivalent in English)
Experiencer object/subject	EQ39	A	A,N	No real equivalent in Japanese
	EQ42	N	N,A	Ditto
	EQ43	N	A	ditto
Discourse referent	EQ45	A	A	No equivalent in Japanese
possibilities (no antecedent)	EQ59	A	A	Ditto
	EQ53	N	A,N	Ditto
Antecedent in previous sentence	JQ32	A	N,A	Japanese supposed to be
	EQ54	M	A,N	acceptable, English marginal
In this family first item has antecedent outside sentence second inside but has double subject	JQ54	N	N	No English equivalent,
	JQ46	A	N	reflexive can't occupy subject position
Use of reflexive to indicate possession	JQ34	A	A	This use is permissible in
	EQ27	N	A,N	English only in picture
	EQ32	A	A	constructions
Backward binding used in Japanese in addition				Exact English translation not
	JQ37	A	A	acceptable, version proposed
	EQ41	N	N	uses reflexive in subject position
Empathy	JQ42	A	A	A Japanese specific

	JQ36	N	N	phenomenon, degree of empathy determines feasibility of binding
'jibun-zisin' must be bound in its GC	JQ24	N	N	No real equivalent in English,
	JQ4	N	N	could be mapped into the
	JQ29	A	A	same semantic space as 'jibun'

Table 4.2 Reflexives: no significant differences

4.7.2 Constructions: significant differences

Table 4.3 brings together the items that are ‘irrelevant’, i.e. don’t appear to contribute anything to the analysis. E/J stands for bilinguals who read the English priming text and were given the Japanese questionnaire, J/J for those who read the Japanese priming text and were given the Japanese questionnaire; E/E stands for bilinguals who read the English priming text and were given the English questionnaire, J/E for those who read the Japanese priming text and were given the English questionnaire,

CONSTRUCTION	REF	EXP	ACT	COMMENT
Personal pronoun reference to previous sentence	JQ35	M	A	E/J bilinguals find it less acceptable than the monolinguals
	EQ38	A	A	
Backward binding, psych verb, subject orientation	JQ57	A	N	J/J bilinguals find it less acceptable than the

rejected in favour of long distance subject orientation in JQ48				monolinguals
Personal pronoun outside the binding domain	EQ6 JQ28	A A	A N	E/E and E+J/E bilinguals find it more acceptable than the monolinguals
Personal pronoun reference inside the binding domain, not acceptable in English	EQ31 JQ26	N A	N N	E/E and E+J/E bilinguals find it more acceptable than the monolinguals
Use of 'self' as noun	EQ44	A	A, N	E/E bilinguals find it less acceptable than the monolinguals

Table 4.3 Reflexives: ‘irrelevant’ differences

The table below brings together the constructions that exhibit significant differences between bilinguals and monolinguals and exhibit a possible second language impact. E+J/J stands for all the bilinguals responding to the Japanese questionnaire; E+J/E stands for all the bilinguals responding to the English questionnaire;

CONSTRUCTION	REF	EXP	ACT	COMMENT
Optional plural marker (mandatory in English) omitted	JQ41	A	A	J/J and E+J/J bilinguals find JQ41 less acceptable than the monolinguals

Personal pronoun, binding outside GC, subject referent	JQ28	A	N	J/J bilinguals find JQ28 more acceptable than the monolinguals
	EQ6	A	A	
Personal pronoun, binding outside GC, object referent	JQ23	A	N	All categories of bilinguals find JQ23 more acceptable than the monolinguals
	EQ24	A	A	
Personal pronoun, binding outside GC, subject referent, no interpretation offered in English (JQ38 bound variable interpretation)	EQ58	A	A	J/E and E+J/E bilinguals find EQ58 less acceptable than the monolinguals
	JQ38	N	N	
	JQ22	A	A,N	
Agreement, referent in Dative case, reflexive in Accusative	EQ46	A	A	All categories of bilinguals find EQ46 less acceptable than the monolinguals
pro-drop, acceptable in Japanese but not in English	JQ60	A	A,N	E/J bilinguals find JQ60 less acceptable than the monolinguals
Ellipsis	EQ30	A	N,A	J/E bilinguals find EQ30 less acceptable than the monolinguals
	JQ8	N	N,A	
Ellipsis	JQ21	A	A	E/J bilinguals find JQ21 less acceptable than the monolinguals
	EQ22	A	A	

Ellipsis	JQ19 EQ33	N A	N,A A,N	E/J bilinguals find JQ19 more acceptable than the monolinguals
Double possessive	JQ27 EQ27 EQ32	M N A	N A,N A	E/J and E+J/J bilinguals find JQ27 more acceptable than the monolinguals
Use of modifiers on reflexives, not acceptable in English	EQ56 JQ40	N A	N A	J/E bilinguals find it more acceptable than the monolinguals
Reflexive not bound within its governing category, not acceptable in English	EQ19 JQ16	N A	N A	E/E and E+J/E bilinguals find it more acceptable than the monolinguals
Reflexive not bound within its governing category, not acceptable in English	EQ13 JQ16	N A	N A	E/E bilinguals find it more acceptable than the monolinguals
Reflexive bound within its governing category, acceptable in English	EQ4 JQ10	A A	A N,A	E/E and E+J/E bilinguals find it less acceptable than the monolinguals
Long distance binding, acceptable in Japanese but not in English	JQ48	A	A	E/J and E+J/J bilinguals find it less acceptable than the monolinguals
Long distance backward binding, allowed in	JQ31 EQ51	A N	A N	J/J and E+J/J bilinguals find it less acceptable than the

Japanese but not in English				monolinguals
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Table 4.4 Reflexives, pronouns and ellipsis: possible 2nd language impact

4.7.3 Constructions: mixture of significant and no significant differences

There are a number of very similar constructions, for some of which the bilinguals’ responses are statistically significant from the monolinguals’, while for some others no difference is apparent. They have been organised by type: object binding, long distance binding (c-command violation) and use of psych verbs. Some items appear in more than one table. While there are more constructions exhibiting long distance binding, for example, than shown in the tables, only those exhibiting statistically significant differences in the bilinguals’ responses and their nearest equivalents equally accepted by all are shown.

CONSTRUCTION	REF	EXP	ACT	COMMENT
Reflexive in topic position (no English equivalent), long distance binding (not acceptable in English), psych verb	JQ48	A	A	E/J and E+J/J bilinguals find it less acceptable than the monolinguals

Object in Accusative case, reflexive in subject position (not acceptable in English), long distance binding (not acceptable in backward binding, psych verb	JQ31 EQ51	A N	A N	J/J and E+J/J bilinguals find it less acceptable than the monolinguals
Reflexive and object in the Accusative case, long distance binding (not permitted in English), psych verb	JQ59	A	A,N	No difference

Table 4.5 Object binding

CONSTRUCTION	REF	EXP	ACT	COMMENT
Object in Accusative case, reflexive in subject position (not acceptable in English), long distance binding (not acceptable in English), backward binding, psych verb	JQ31 EQ51	A N	A N	J/J and E+J/J bilinguals find it less acceptable than the monolinguals

Long distance binding and reflexive in subject position (neither acceptable in English)	JQ14	A	A	No difference
	EQ10	N	N,A	
Reflexive in topic position (no English equivalent), long distance binding (not acceptable in English), psych verb	JQ48	A	A	E/J and E+J/J bilinguals find it less acceptable than the monolinguals
Reflexive and object in the Accusative case, long distance binding (not permitted in English), psych verb	JQ59	A	A,N	No difference
Psych verb, masculine referent in subject position	EQ19	N	N	E/E and E+J/E bilinguals find it more acceptable than the monolinguals
	JQ16	A	A	
Psych verb, feminine referent in subject position	EQ13	N	N	No difference

Table 4.6 Long distance binding

CONSTRUCTION	REF	EXP	ACT	COMMENT
Object in Accusative case, reflexive in subject position (not acceptable in English), long distance binding (not acceptable in English), backward binding, psych verb in sentence containing referent	JQ31 EQ51	A N	A N	J/J and E+J/J bilinguals find it less acceptable than the monolinguals
Reflexive in topic position (no English equivalent), long distance binding (not acceptable in English), psych verb	JQ48	A	A	E/J and E+J/J bilinguals find it less acceptable than the monolinguals
Reflexive and object in the Accusative case, long distance binding (not permitted in English), psych verb	JQ59	A	A,N	No difference
Backward binding to object, long distance, psych verb in sentence containing referent	JQ49	A	A,N	No English equivalent, no statistically significant differences

Psych verb, masculine referent in subject position, reflexive in Accusative case, long distance binding	EQ19 JQ16	N A	N A	E/E and E+J/E bilinguals find it more acceptable than the monolinguals
Psych verb, feminine referent in subject position, reflexive in Accusative case, long distance binding	EQ13	N	N	E/E bilinguals find it more acceptable than the monolinguals
Psych verb, masculine referent in subject position, reflexive in Accusative case, local binding	EQ34 JQ10	A N,A	A A	
Psych verb, feminine referent in subject position, reflexive in Accusative case, local binding	EQ4	N	N	E/E and E+J/E bilinguals find it less acceptable than the monolinguals
Psych verb, feminine referent in Dative case, reflexive in Accusative case, long distance binding	EQ21	N	N	No difference
Psych verb, masculine referent in Dative case, reflexive in Accusative case,	EQ25 JQ20	N N	N N	No difference

long distance binding				
Psych verb, referent in	EQ41	N	N	No difference
Nominative case, reflexive in subject position, long distance binding	JQ37	A	A	
Psych verb, referent in	EQ51	N	N	No difference
Accusative case, reflexive in subject position, long distance binding	JQ31	A	A	

Table 4.7 Psych verbs

All the constructions that exhibit versions with both statistically and no statistically significant differences include a psych verb. The pattern emerging is that in Japanese, the constructions that the monolinguals fully accept, the bilinguals find less acceptable. They concur, however, with the monolinguals when these are split or fully reject the construction. In English a different pattern emerges. The bilinguals find more acceptable than the Anglophones constructions that, while long distance (not acceptable in English), exhibit subject orientation. They also find less acceptable some constructions where a local rather than a long distance interpretation is proposed. All bilinguals' responses veer toward the middle. Out of a total of 114 items 44 use psych verbs, 70 do not. Out of the 44 the bilinguals exhibit significant differences in 8, out of the 70 in 13, in both cases

about 18%. Psych verbs have been known to cause difficulties for the binding theory. There seems however to be nothing special about items using psych verbs when all the items in the experiment are taken into account.

4.7.4 Summary

The table below is a variation of the table in Chapter 2 showing the expected rules of Japanese and English. Where the result is different from the one expected, this is marked in italics. In addition, comments have been added to indicate the constructions for which bilinguals’ judgements differ significantly from monolinguals’.

Characteristics of anaphora	English	Japanese
Double genitive allowed	Yes	No
<i>Japanese bilinguals +A</i>	27,32	27
binding in the governing category mandatory	Yes (57,48)	No (53,58)
long distance reflexives used	No	Yes
<i>no ambiguity allowed in Japanese; Japanese bilinguals +A</i>	15,13d, 25,21d, 34,4d	16,20,10
no antecedent constructions acceptable (but of different types)	Yes	Yes
<i>no ambiguity allowed in Japanese</i>	45,54	32,46,54
modifiable anaphors	No	Yes

<i>English bilinguals +N</i>	56,44	40
gender, person and number agreement with antecedent	Yes	No
mandatory <i>Japanese bilinguals more keen on number agreement</i>	56	33,41
the antecedent of the reflexive must be animate	No	Yes
	50	39,43
the reflexive can occupy the embedded subject position	No	Yes
	10,36	14,6
	51	31
the reflexive can occupy the possessive position	No	Yes
		34
strong preference for a subject antecedent	No	Yes
<i>no ambiguity allowed in some English constructions, in such cases subject antecedent only one accepted</i>	5,16d,9	7,15
	,23d,	
	8,12d,	9,13
	17	picture np
	46	
		48,57
counter example: direct passive unambiguous	N/A	Yes
		11,17
indirect passive ambiguous <i>no ambiguity allowed</i>	N/A	Yes
		12,18
non-agentive causative + backward binding	N/A	Yes

	41,51	37,31
Reflexive can be construed as bound variable at LF	No	Yes
<i>Bilinguals -A</i>		45
empathy	No	Yes
		42,36
acceptable 'subject comparison' interpretation of elided clauses: 2 ways <i>accepted in Japanese, bilinguals +N</i>	Yes	No
	22	21
3 ways <i>not accepted in English</i>	7	30
Acceptable 'object comparison' interpretation of elided clauses	Yes	Yes
2 ways <i>not acceptable in duplicate example in English, not acceptable in Japanese, Japanese bilinguals +A</i>	33,26d	19
		8
3 ways <i>not acceptable in English, bilinguals +N</i>	30	
Acceptable 'sloppy' interpretation of elided clauses	Yes	Yes
3 ways only	18	25
acceptable use of pronouns as anaphors	No	Yes
<i>no acceptable version in Japanese</i>	31,37,	26,5
	28	
Personal pronouns construed as bound variable at LF	Yes	No
<i>English bilinguals -A</i>	58	38,22
Personal pronouns co-referenced with proper name	Yes	Yes
<i>no acceptable version in Japanese</i>	52	44,55
pro-drop	No	Yes

<i>Bilinguals -A</i>		60
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Table 4.8 Expected versus actual

4.8 Consistency tests

The monolinguals do not appear to agree with each other on a substantial proportion of items. (27% for the Anglophones, 23% for the Japanese monolinguals). A number of tests were carried out to see how far these inconsistencies went, e.g. dialect, level of English and self consistency for given individuals. There seemed to be little variation for the Anglophones on the basis of dialect. A fair amount of variation seemed apparent for the Japanese monolinguals. All the Japanese monolinguals involved in the study were taking English classes. The higher the level of English studied, the more likely the subjects became to accept some constructions . None of these variations impacted the basic rejection of ambiguity by Japanese monolinguals.

4.8.1 Dialect Impact

Contrary to the author’s expectations, there was more consistency across Anglophones than across Japanese speakers.

English

No specific tests were carried out. Comparison between the chi square analyses of the responses of Anglophones in the pilot (drawn from various parts of the US and attending an American school in England), and those of the Delaware students (most of whom

came from Delaware with a minority from Maryland and Philadelphia), show a few slight changes in the way the monolinguals are split over the acceptability of a number of items.

Japanese

The Waseda forward group, limited to Tokyo ben respondents only, was compared to the Nanzan University 11.30 Nagoya ben group (see also below). Both groups are formed of students majoring in Economics. 12 significant differences were found. With one exception (JQ 57), all the 11.30 responses were less extreme than the Waseda responses, i.e. if Waseda students found a item unacceptable, the 11.30 group will find it more acceptable, if Waseda students found it acceptable the 11.30 students found it less acceptable.

JQ4, JQ27, JQ30 and JQ57 were found overall unacceptable by both groups.

(76) 'John_i - ga Bill_j - ni Peter_k - ga jibun - zisin_{*i/*j/k} - o semeta - to itta. '

John-NOM Bill-to Peter-NOM self-ACC blamed-COMP said

JQ4. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga Bill - o semeta - to itta.

*'*John - ga Peter - no jibun - no shashin - o mita.'*

John-NOM Peter-GEN self-GEN photograph-ACC saw

JQ27. John - ga Peter - no jibun - no shashin - o mita.

(77) 'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'

JQ30. Peter - wa Paul yori jibun -o umaku bengosuru.

= *Peter -wa Paul - ga Peter - o bengosuru yori umaku jibun-o bengosuru.*

'John_i - wa Mary_j - ga jibun_{i/j} - o aisite iru koto - o sitte ita.'

John-topic Mary-NOM self-ACC is loving that knowing was

John knew that Mary loves himself/herself

JQ57. John knew that Mary loves herself

JQ7, JQ9, JQ14 and JQ31 were found overall acceptable by both groups.

(78) *'John_i - ga Bill_j - ni jibun_{i/*j} - no koto - o hanashita.'*

John-NOM Bil-DAT self-GEN matter-ACC talked

John talked to Bill about self's matter

JQ7. John talked to Bill about John's matter

(79) *'John_i - ga Bill_j - ni jibun_{i/*j} - no syasin - o miseta.'*

John-NOM Bil-DAT self-GEN picture-ACC showed

John showed Bill a picture of self.

JQ9. John - ga Bill - ni jibun - no syasin - o miseta.

= *John - ga Bill - ni John - no syasin - o miseta.*

(80) *'John_i - ga Bill_j - ni jibun_{i/*j} - ga siai - ni katta - to itta.'*

John-NOM Bill-DAT self-NOM that game-DAT won-COMP said

JQ14. John - ga Bill - ni jibun - ga siai - ni katta - to itta.

= *John - ga Bill - ni John - ga siai - ni katta - to itta.*

(81) 'Jibun_i - ga gan kamo sirenai koto-ga Mitiko_i - o nayama-se-ta.'

self-NOM cancer may have that Mitiko-ACC worried-make-past

That self might have cancer worried Mitiko

JQ31. Jibun - ga gan kamo sirenai koto-ga Mitiko - o nayama-se-ta.

The 11.30 group found JQ16 unacceptable; the Waseda group found it acceptable. A similar effect was observed for JQ 25.and JQ29. The opposite effect was observed for JQ 46.

(82) 'John_i - ga Bill_j - ni Peter_k - ga jibun_{i/*j/k} - o semeta - to itta.'

John-NOM Bill-to Peter-NOM self-ACC blamed-COMP said

JQ16. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga John - o semeta - to itta.

(83) 'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'

JQ25. Peter - wa Paul yori jibun - o umaku bengosuru.

= Peter - wa Paul - ga Paul - o bengosuru yori umaku jibun - o

(84) 'John_i - ga Bill_j - ni Peter_k - ga jibun - zisin_{i/*j/k} - o semeta - to itta. '

John-NOM Bill-to Peter-NOM self-ACC blamed-COMP said

JQ29. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga Peter - o semeta - to itta.

(85) 'John - to Paul_j -wa tomodachi da. John_i - ga jibun_{i/*j} - ga tensai-da to omotte-iru.'

John-NOM he-NOM genius-COP COMP think-PRES

JQ46. John - to Paul -wa tomodachi da. John- ga jibun - ga tensai-da to omotte-iru.

= John - ga John - ga tensai-da to omotte-iru.

4.8.2 Impact of English level

Three groups of Japanese monolinguals were tested at Nanzan: one majoring in Economics the other two in English. They are identified by the time of testing – 11.30 the Economics students, 9.30 the 2nd year English students, 14.30 the first year English students. With the exception of JQ20, for all cases of significant differences between any two given groups, the respondents with the higher level of English find the items more acceptable than their counterparts. Note also that the 9.30 group was tested half way through an English lesson. Note that the higher acceptability did not result in the acceptance of ambiguity in any of the groups.

The results of the comparisons are to be found in the figure 4.2.

4.8.3 Self consistency tests

These were carried out only for Japanese monolinguals. The two groups from Waseda University did the test twice at an interval of 2 weeks.

The first group was given the questionnaire in the forward direction both times, the second in the reverse direction the first time, in the forward direction the second.

There were 19 repeats in the first group, 30 in the second. The data underwent re-coding: 1-3 became 0, 4-6 became 1. The first and second batch of responses were tabulated per item, then per participant.

Out of 57 items, 31 showed inconsistency in at least one group of participants, 14 showed inconsistency in both groups. Inconsistency was defined as less than 70% consistent answers for any given item in a group of participants. They were graded from 1 to 4, where 1 is between 60% and 69%, 2 between 50% and 59%, 3 between 40% and 49 % and 4 under 40%. The inconsistencies occurred mainly for items where the responses differed predominantly from the expected (10 out of 14) and where the respondents were split (12 out of 14). 9 out of 32 were found for monolinguals that agreed with each other and with the expected result. The doubles (inconsistencies in both groups) were distributed as follows: 7 for responses differing from the expected, 5 for split responses, 2 for the rest. 8 out of the 10 items including personal pronouns exhibited at least a degree of inconsistency. This was also the case for 5 out of the 5 ellipsis items, indicating these two areas as most insecure for the Japanese monolinguals. It might have been expected that the constructions in which monolinguals exhibit inconsistencies would also be those in which bilinguals exhibit significant differences from the monolinguals, in other words

constructions in the judgement of which monolinguals were insecure would be wide open to a second language impact. This was not the case.

Individuals' consistency was found to range between 57% and 93% for respondents in the forward direction, between 62% and 87% for respondents in the reverse direction.

The results are captured in Figure 4.3.

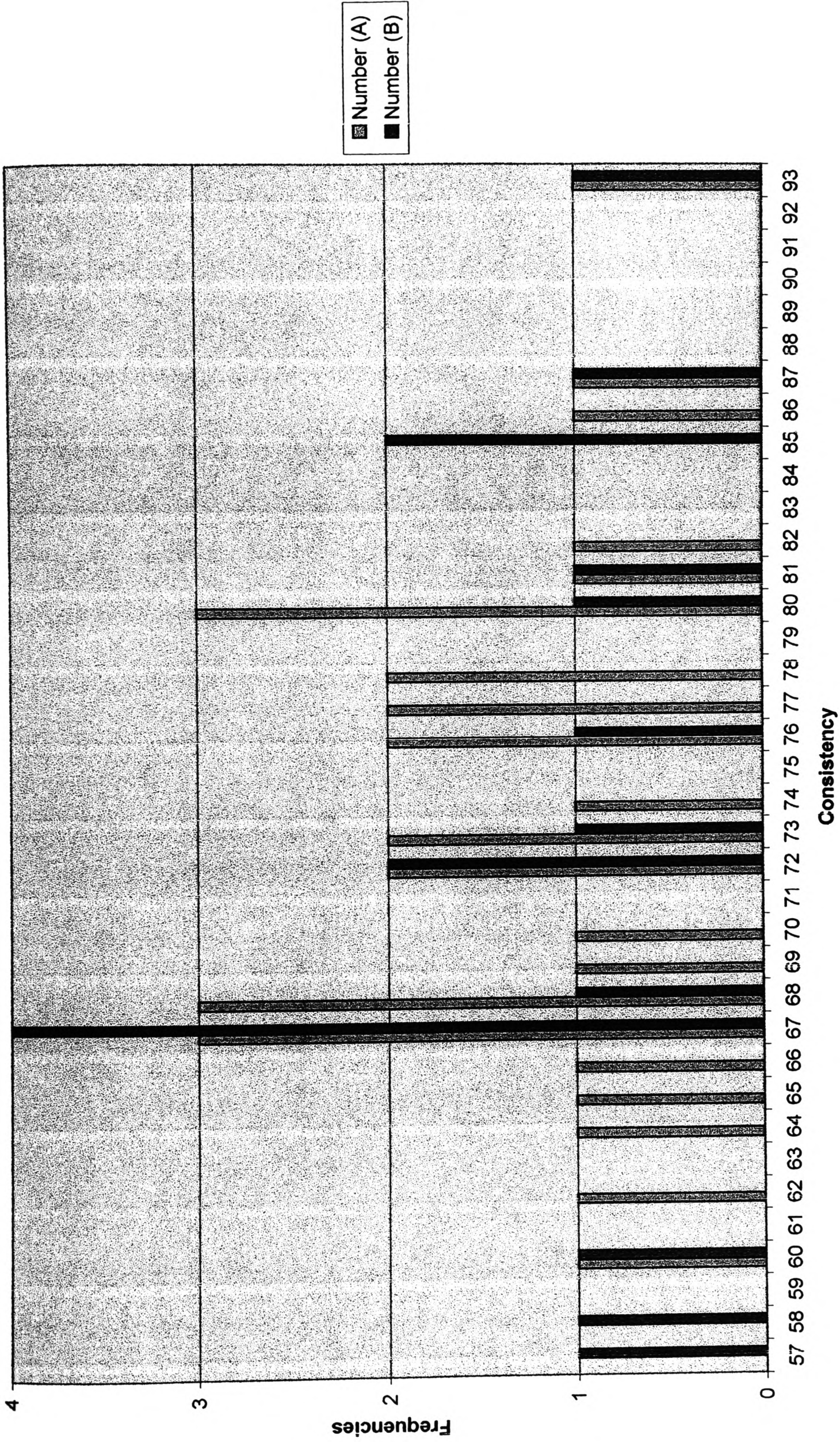


Figure 4.3 Self-consistency A = forward/forward, B = reverse/forward

4.9 Main Results

This chapter summarises the main result of the experiment in terms of comparison of bilinguals' and monolinguals' interpretation of anaphora and also the correspondence between expectation and actual responses for monolinguals as well as consistency across monolingual groups.

4.9.1 Bilinguals versus monolinguals

The main focus of the data collection and the subsequent analysis has been on the differences and similarities in the interpretation of anaphora by balanced bilinguals compared with monolinguals. With a number of exceptions, bilinguals appear to have the same competence as their monolingual counterparts, even when these rules are different across the two languages. This is particularly striking when it comes to accepting or rejecting ambiguity. The Anglophones are happy to accept it, the Japanese monolinguals reject it. The bilinguals accept ambiguity in English but not in Japanese.

Overall, out of 57 items in the English questionnaire, 10 exhibited significant differences for at least one subject group (E/E, J/E, E+J = all bilinguals who filled in this questionnaire). Four items exhibited differences in two groups. Out of the 57 items in the Japanese questionnaire, 11 exhibited significant differences in at least one group, 5 of which were in two or more subject groups. Overall, in 15 out of 21 items the bilinguals veer towards a middle position (less acceptable if found acceptable by the monolinguals, more acceptable otherwise. This is also the case for all items where significant differences were exhibited by two or more categories of bilinguals. Some of the statistical

differences appeared irrelevant to the analysis, e.g. a category of bilinguals finding a statement rejected by the monolinguals even more unacceptable. All the remaining 16 relevant items displayed a potential second language influence.

As per the hypothesis, the bilinguals appear to have two sets of rules for their two languages. These sets are similar but not identical to those of the monolinguals. Bilinguals and monolinguals judge a number of constructions (e.g. inanimate antecedent) in the same way. Others, like personal pronouns bound outside GC, are judged differently. There is, however, a third category of constructions, e.g. long distance binding which exhibits examples in both categories. All the constructions that exhibit versions with both statistically and not statistically significant differences include a psych verb. All bilinguals' responses veer toward the middle.

4.9.2 The disagreeing monolinguals

As per the hypothesis, the monolinguals are not in full agreement for some items. What was somewhat surprising was the large number of items for which this occurred.

Anglophones

At least 33% of the Anglophones disagree with the majority on 18 items. With two exceptions (EQ30 which the bilinguals who read the Japanese priming text find significantly less acceptable than the monolinguals, and EQ44 which the bilinguals who read the English priming text find significantly less acceptable than the monolinguals),

the bilinguals' responses exhibit no statistically significant differences from the monolinguals'.

Japanese Monolinguals

The Japanese monolinguals are split for 14 items, three of which appear in 4.6.1.2 as being rejected contrary to expectation. (JQ10, JQ46, and JQ32) With two exceptions (JQ19 which the bilinguals who read the English priming text find significantly more acceptable than the monolinguals, and JQ60 which the bilinguals who read the English priming text find significantly less acceptable than the monolinguals), the bilinguals' responses exhibit no statistically significant differences from the monolinguals'. With the exception of the ellipsis examples JQ8 and JQ19, accepted by some monolinguals in spite of expectations to the contrary, in all the other cases at least 33% of monolinguals reject the 12 items supposed to be acceptable.

4.9.3 The inconsistent monolinguals

These tests have been carried out only with Japanese monolinguals. The hypothesis was that some self-inconsistencies for the individual respondents were to be expected. This was proved correct.

What was surprising was the low degree of self-consistency exhibited, some as low as 60% or less, leaving one with the question of how the rules are stored in the brain. A large proportion of the items which show a lot of inconsistency are related to pronouns

and elided constructions (neither of which are used much in Japanese). This may imply that these constructions have not been fully assimilated.

4.9.4 Actual versus expected

The monolinguals exhibit judgements different from those predicted by the literature and/or my two Japanese linguist informants. No such hypothesis had been postulated.

Anglophones

There are six items that the Anglophones are supposed to find acceptable but do not, and one for which the reverse occurs. The bilinguals' responses exhibit no statistically significant differences from the monolinguals'.

Japanese Monolinguals

The Japanese monolinguals judge 15 items in the opposite way to that expected. In every single case they reject items deemed acceptable in the literature and/or by my two informants, Japanese linguists at Oxford University. The bilinguals' responses exhibit no statistically significant differences from the monolinguals', with the exception of JQ27, JQ28 and JQ23 that one or more category of bilinguals find significantly more acceptable, and JQ57 that is found even less acceptable by the bilinguals who had read the Japanese priming text.

5. Issues arising

This chapter looks in some detail at the significant results identified in chapter 4. In the process of looking for a rationale for the findings, different approaches, both statistical and non-statistical are used. These types of approach are weighed against each other and a favourite is proposed. The chapter concludes with some suggestions as to how the competing approaches could be further investigated.

The introduction recapitulates the hypotheses and compares them against the main results outlined in the previous chapter. Section 5.2 expands on the findings and analyses them. Section 5.3 presents some ways of interpreting the findings. Section 5.4 looks at what these interpretations mean for the underlying grammatical model. Section 5.5 proposes some topics for further investigation. The chapter concludes by stating what we have learned from this work.

5.1 Introduction

This section summarises the main results of the experiment in terms of a comparison of bilinguals' and monolinguals' interpretation of anaphora, correspondence between expected and actual responses for monolinguals, as well as consistency across monolingual groups, as against the hypotheses outlined in the first two chapters.

The hypotheses set out in Chapter 1 & 2 are listed below in italics. Each of them is followed by the findings of the thesis.

- Bilinguals have two sets of rules for their languages.

As set out in Chapter 1 a set of rules is interpreted throughout the thesis to mean the collection of specific rules which a speaker applies in the domain of anaphora to a given language. It is hypothesised that a bilingual has two such sets, one applicable for each language. While there may be rules in common between the two sets, such that from a mathematical point of view they can be said to overlap, no inference is drawn regarding the storage and representation of these sets of rules in the brain.

The results indicate that indeed the bilinguals have two sets of rules for their languages. This is apparent, for example, from bilinguals and monolinguals judging in the same way constructions that are acceptable in one language but not the other (e.g. an inanimate antecedent is acceptable in English, but not in Japanese, while the use of *jibun* in subject position or in the Genitive is acceptable in Japanese but not in English). The hypothesis appears to be correct (see also 4.3).

- These sets of rules result in judgements which are statistically identical to those of the respective monolinguals and exhibit no cross-language influence.

These rules are similar, but not identical to those used by the monolinguals. Given that balanced bilinguals can pass for monolingual speakers in both their languages, the first part of the previous statement is not really surprising. Out of the 57 items in the English questionnaire (excluding the three training items), 17% exhibited significant differences between the bilinguals and the monolinguals. This was also the case for 18% of the items belonging to the Japanese questionnaire. Out of a total of 21 items exhibiting significant

differences, 16, i.e. 76% display a potential second language influence. The hypothesis is shown to be incorrect (see also 5.2.1 and 5.3.1).

- The priming text (given to subjects to read immediately prior to the data collection) has no impact on these judgements.

No such impact is apparent; out of a total of 21 items exhibiting significant differences only 6 could possibly be said to be the result of the priming language, in other words less than the 50% chance occurrence (see 4.4). The hypothesis appears to be correct.

-Inconsistencies (in other words, for at least some constructions a significant number of respondents, at least 30%, will disagree with the majority), as well as some self-inconsistencies (individuals giving some widely disparate responses on repeat tests) are expected in the monolingual groups.

While, as per the literature, inconsistencies as well as some self-inconsistencies are to be expected in the monolingual groups, the high percentages encountered were somewhat surprising. The hypothesis appears to be correct (see also 5.2.3 and 5.3.3).

- P&P Principles and Parameters is expected to be a suitable syntactic framework for this thesis.

P&P on its own does not explain all the results whether in terms of bilinguals differing from the monolinguals or in terms of lack of consistency/self-consistency. The hypothesis appears to be at least partly incorrect (see discussion below in 5.2.2 and 5.3.3).

- The anaphora features as described in the literature and captured in tables 2.2 and 2.3 are correct.

The monolinguals exhibit judgements different from those predicted by the literature and/or my two Japanese linguist informants (see 5.2.2 and 5.3.2). The hypothesis appears to be incorrect.

5.2 Main findings expanded and analysed

5.2.1 Differences between bilinguals and monolinguals

No grammar proposed so far has been found to be a perfect fit for any language. It is not known to what extent any grammar reflects the reality in the brain. This has so far at least not been a criterion for comparing grammars. The rest of the chapter will examine to what extent the results of our experiment fit with P&P. This will be done by using theory-internal distinctions, e.g. types of features or simple versus complex rules. Such distinctions are largely theory internal. They are devices invented to help us make sense of certain linguistic observations and are by their very nature, tentative. Take for example the simple versus complex distinction. In P & P a simple rule could be defined as a rule involving a single parameter. It would then be a question of which set of parameters one uses, as conceptually one could use one or more parameters in different parameter sets to get the same final effect. Of course, the more a theory is self consistent, and the more its predictions fit observed reality, the likelier it is that the model underlying the theory reflects the reality in the brain.

A total of 21 items (from the overall 114 in the two questionnaires combined; this excludes the 6 training questions) were found to exhibit significant differences between bilinguals and monolinguals. The significance level was set at 5%, ($p < 0.05$); all items with the exception of three showed a significance level of 0.02 or less (i.e. a higher degree of significance). Five of these items do not show a potential 2nd language influence; we have not found an explanation for the discrepancy between monolinguals and bilinguals in these cases. The rest of this chapter concentrates on the remaining 76% of the items that do show a potential 2nd language impact.

A possible way of interpreting the results would be to postulate that different rules belong to different categories and are affected in a different way by a second language, e.g. while morphological rules are kept separate, there is a process which maximises syntactic commonality for the sake of economy. Within this context one could further hypothesise that the characteristics of anaphora fall into different categories. The categories suggested within this framework are semantic, featural and structural. As noted earlier these categories are theory-internal and tentative. It is perfectly imaginable to come up with a different set of categories, e.g. language-dependent versus language-independent. Such a division would group together all the characteristics that differ between English and Japanese (e.g. inanimate antecedent and reflexive in subject position) on the one hand, and all the common ones on the other. Such an approach would, however, be language specific – the features in the common set for English and Japanese would be different from say those in the English/French set. The categories suggested earlier appear to apply across languages, and as such are preferable.

Another possible interpretation is that there are simple and complex rules, the simple rules are easier to assimilate and follow, therefore less likely to be affected by a second language. This interpretation involves three assumptions. The first two are that there are such things as simple and complex rules and we know how to differentiate between them. As noted above, simplicity is very much theory dependent. Even if we were certain of having the right set of rules, this would not necessarily define complexity in a straightforward manner. The third assumption is that such simplicity or complexity has an impact on ease of learning. This appears a logical assumption, but it is an assumption nevertheless. Even if it were the case, lots of other factors may be involved in ease of learning, and they may have a much bigger impact than simplicity or its absence.

A further possibility is that what we are seeing is the result of acquisition order; the rules assimilated later in development are more likely to be assimilated incompletely, given the fact that two languages are being learnt at the same time. This may be combined with one or both the possibilities above. For example, a simple rule may be learned earlier than a complex one.

Categories of anaphora characteristics

The analysis of the experiment results indicates a number of characteristics for English and Japanese anaphora, not always in line with expectations. These can be grouped into featural, semantic and structural characteristics. Such a grouping is theory-internal to GB

although it also reflects in some measure some older theories of grammar, as well as the currently accepted division into morphology, semantics, syntax and phonology.

The featural characteristics tested for reflexives encompass case, agreement, the use of the double genitive and the application of modifiers. In both languages, the reflexive can be used in the Accusative and the Dative. In Japanese, additionally, the reflexive can be used in the subject position, in the Nominative, and to express possession, in the Genitive. In English the reflexive must agree in person, gender and number with its antecedent. None of these requirements apply to Japanese, which imposes a different requirement, mainly that the antecedent be animate (not the case for English). The use of the double genitive is acceptable in English (as two forms are available, that introduced by 'of' and 's'). There is only one possible form in Japanese, the equivalent of 'of' so the use of the double genitive is not acceptable. On the other hand, in Japanese, modifiers can be applied to *jibun*, which is not the case in English.

The only featural characteristic tested for personal pronouns, is the one referring to the use of the double genitive, acceptable in English but not in Japanese. No specific tests have been carried out to determine the case pronouns can have in a sentence, nor has the requirement for agreement been explicitly tested. The Japanese monolinguals (and their bilingual counterparts) reject a number of constructions in all their proposed interpretations, leaving a small number of examples for analysis. We have no explanation for this rejection, other than the speculation that *jibun* would have been preferred.

The semantic characteristics tested for reflexives encompass discourse referent possibilities, empathy and ambiguity. Both languages allow some constructions containing no explicit antecedent. While in Japanese these can refer to all persons, in English this is mainly the case for the first person. Empathy is something that exists only in Japanese and determines whether a given verb can be used in conjunction with *jibun*. The Japanese informants seem to be operating with the heuristic that no construction can have more than one meaning. In English ambiguity is accepted.

The only semantic characteristic tested for personal pronouns was ambiguity, which was found to be allowed in English but not in Japanese.

The structural characteristics tested for reflexives encompass bound variable reading, strong subject orientation and long distance binding. Bound variable reading is possible in Japanese as well as in English (the latter was not tested here). Long distance binding is possible in Japanese, but not in English. Both languages exhibit a certain degree of subject orientation; in Japanese this is stronger than in English. In Japanese long distance binding and a strong subject orientation can be grouped together as argument structure sensitivity. This would be contrasted with c-command structural sensitivity in English.

The structural categories tested for personal pronouns encompass bound variable reading, pro-drop and argument/c-command structural sensitivity.

Featural and semantic characteristics

Bilinguals appear to be similar to their corresponding monolingual counterparts in their understanding of the featural and semantic characteristics of their languages:

- in English the reflexive can be used in the Accusative and the Dative
- in Japanese, additionally it can be used in the Nominative and the Genitive
- in English the reflexive must agree with its antecedent in person, gender and number
- in Japanese there is no morphological expression for the agreement between the reflexive and its antecedent
- in Japanese the antecedent of a reflexive must be animate
- in English the use of the double Genitive with personal pronouns is allowed
- in Japanese the use of the double Genitive with personal pronouns is not allowed

A comparison between monolinguals and bilinguals indicates only a few differences in the featural characteristics (unless otherwise mentioned, these differences refer solely to the reflexive):

- Number agreement: while the Japanese monolinguals are happy to accept 'jibun' with a plural antecedent, the bilinguals are significantly less so, indicating a possible influence from English.
- Double genitive: the Japanese bilinguals appear more willing to accept the use of the double genitive, indicating a possible 2nd language influence
- Modifiers: the bilinguals find the use of modifiers in English even less acceptable than the Anglophones. There is no obvious explanation for this.

There are no differences between bilinguals and monolinguals for the semantic-related characteristics.

The majority of the differences between monolinguals and bilinguals appear clustered in the area of argument/c-command structural sensitivity.

The table below summarises the main characteristics of *jibun* versus the English reflexive with respect to GB as per the experiment results (see chapter 4). An ‘*’ indicates the bilinguals’ responses differ significantly (as per the Mann-Whitney U test) from the monolinguals’.

Japanese	English
+Nom/+Acc/+Dat/+Gen -person/-gender/-number*/+animate -double genitive* <i>-double genitive (pronoun, not tested)</i> +modifiers	-Nom/+Acc/+Dat/-Gen +person/+gender/+number/+animate +double genitive <i>+double genitive (pronoun)</i> -modifiers(* +N)
Limited discourse referent possibilities (all persons) Empathy(lexical verb choice) No ambiguity/make a choice <i>No ambiguity/make a choice (pronoun)</i>	Very limited discourse referent possibilities (mainly first person) Ambiguity allowed <i>Ambiguity allowed (pronoun)</i>
Bound variable reading possible	Bound variable reading possible(not tested)

<i>Bound variable reading possible (pronoun)</i>	<i>Bound variable reading not possible</i>
	<i>(pronoun) *</i>
Argument structure sensitivity *	c-command structural sensitivity *
(Long distance binding possible, in some cases preferred) *	(long distance binding not possible) *
<i>Argument structure sensitivity (pronoun) *</i>	<i>c-command structural sensitivity</i>
	<i>(pronoun) *</i>

Table 5.1 Main characteristics of Japanese and English anaphora

The characteristics exhibiting differences between monolinguals and bilinguals are addressed in more detail below, and refer to reflexives, unless otherwise specified (see also chapter 4).

Argument versus c-command structural sensitivity

Both the strong subject orientation in Japanese (which manifests itself as a rejection of an object antecedent) and the acceptability or otherwise of long distance binding show a mixture of agreement and lack of agreement between bilinguals and monolinguals (see chapter 4). The cases where the bilinguals differ from the monolinguals could indicate a second language impact. It is unclear, however, why this should happen in some cases, and not in others. This phenomenon is particularly obvious in the cases of some duplicates (the only difference between which lies in the names and gender of the persons named). For example, no differences between bilinguals and monolinguals arise for

EQ34, but they do for its duplicate EQ4. A similar phenomenon occurs for EQ19 (significant differences for E/E and E+J/E bilinguals) and EQ13 (significant differences for E/E bilinguals only). Whenever such differences are present they could be attributable to a second language influence. Note that this does not happen for the pair EQ21 and EQ25, both of which as well as their Japanese equivalent are found unacceptable.

The differences exhibited by the bilinguals in the case of the personal pronouns could be a result of the influence of their second language. Unlike the case for reflexives, there do not seem to be examples for which the bilinguals and the monolinguals agree, while disagreeing on other, very similar ones. This may be, however, due to the small number of examples involved compared to those for the reflexives.

Examples involving ellipsis lead to disagreement amongst monolinguals and bilinguals alike; the respondents are split on 5 of the 10 examples.

There are two types of elided clauses, those theoretically capable of a maximum of three interpretations (e.g. *Peter defends himself better than Paul*) and those capable of a maximum of two (e.g. *Peter defends Mary better than Paul*). See also subsection 5.4.2.

The table below shows the results of the tests; a significant difference between monolinguals and bilinguals is indicated by an *.

Type	Japanese	English
Maximum of three possible interpretations	+sloppy -subject comparison (strict) -object comparison(split)	+sloppy -subject comparison(split) -object comparison(split) *
Maximum of two possible interpretations	+subject comparison * -object comparison (split) *	+subject comparison +object comparison (split)

Table 5.2 Ellipsis as viewed by Japanese and English respondents

In the case with three possible interpretations, the bilinguals who had read the Japanese text, and filled in the English questionnaire appeared to reject the object comparison more vehemently than the other respondents to the same questionnaire. This could be due to a 2nd language effect, as the respondents to the Japanese questionnaire reject the equivalent item that much more vehemently. In the case with two possible interpretations, the bilinguals who had read the English text, and filled in the Japanese questionnaire find the object comparison more acceptable than the other respondents to the same questionnaire. This could be due to a 2nd language effect, as the respondents to the English questionnaire accept the equivalent item.. There is no obvious explanation for the subject comparison (strict) difference.

5.2.2 Discrepancies between found and expected results

The monolinguals exhibit judgements different from those predicted by the literature and/or my two Japanese linguist informants. Table 4.1 in chapter 4 captures these

differences. One of the main differences lies in the domain of ambiguity. The Japanese monolinguals totally reject it. The Anglophones accept it, but less than expected. The bilinguals are open to ambiguity in English but not in Japanese, so follow in part the monolinguals. See subsection 5.4 for some possible explanations.

Note that the respondents make a categorical choice. For example, in English the antecedent of a reflexive can be either a subject or an object. Although in some cases the respondents reject object binding, e.g. EQ9, they also show that when such a choice is made impossible by the need for gender agreement, they are clear that using the object as an antecedent is fully acceptable.

Anglophones

In three cases involving the reflexive the Anglophones do not accept ambiguity and exhibit a preference for the subject as antecedent. They also reject all but one of the three interpretations of elided clauses expected to be acceptable. The bilinguals' responses exhibit no statistically significant differences from the monolinguals'. We refer to monolinguals and bilinguals jointly as respondents.

There are 6 pairs of items expected to be ambiguous: two involving a reflexive (EQ5 & EQ9, EQ8 & EQ17), two involving a personal pronoun (EQ6 & EQ24, EQ11 & EQ29) and two involving ellipsis (EQ22 & EQ33, EQ18 & EQ7 & EQ30). The ambiguity is not recognised as such in the items involving the reflexive. The antecedent in both cases could be a subject or an object. In each case the respondents choose the subject binding. This does not appear to have anything to do with rejection of an object as an antecedent,

as an item that can only have an object as an antecedent due to gender agreement is fully accepted by all respondents. In one pair involving ellipsis, ambiguity is recognised by most respondents. In the second (which is in fact a trio of statements), only a minority of respondents accepts the ambiguity (but see argument in 5.4.2 that indicates that the expectation for the construction to be ambiguous may be incorrect). While failure to recognise ambiguity involving ellipsis is not surprising, the strong preference for a subject antecedent with a reflexive (unless forced by number and gender agreement) is unexpected. This suggests that subject orientation with reflexives may be a default interpretation (in parameter, lexicon or rule order terms), particularly as it appears in Japanese as well.

Japanese Monolinguals

The Japanese monolinguals reject 16 items deemed acceptable in the literature and/or by my two informants, Japanese linguists at Oxford University and accept one (JQ21, involving ellipsis) which is deemed acceptable. These cases include every single case of ambiguity and a number of constructions including pronouns (for which no interpretation is deemed acceptable). The bilinguals' responses exhibit no statistically significant differences from the monolinguals' in 11 out of the 17 cases. The exceptions are JQ19, JQ27, JQ28 and JQ23 that one or more category of bilinguals find significantly more acceptable, JQ21 that is found less acceptable by bilinguals who had read the English text, and JQ57 that is found even less acceptable by the bilinguals who had read the Japanese priming text.

There are 4 pairs of items involving a reflexive (JQ12 & JQ18, JQ16 & JQ10, JQ48 & JQ57, JQ52 & JQ 59) , 4 involving a pronoun (JQ28 & JQ23, JQ26 & JQ5, JQ44 & JQ55, JQ35 & JQ47) and one involving ellipsis (JQ25 & JQ8) which could be expected to show ambiguity. The only pair that shows some measure of ambiguity is the JQ35, JQ47 pair, in which the first item is deemed acceptable by all respondents, while the second is deemed acceptable by 50% of them. All these items are to be found below.

In the examples below *jibun* is used to indicate possession.

- (1) 'Mary_i - wa Bill_j - ni jibun_{i/j} - no kazoku-no hanashi bakari sa-re-ta.'
- Mary-Top Bil-DAT self-GEN family-GEN talk only do-passive-past
- Mary was affected by Bill's talking only about self's family.

JQ12. Mary was affected by Bill's talking only about Mary's family.

JQ18. Mary was affected by Bill's talking only about Bill's family.

The respondents reject JQ12, with its subject oriented binding, while JQ18, featuring the object orientation, is accepted by 50% of them.

A similar effect occurs with a psych verb without the use of the reflexive to express possession:

- (2) 'Mary_i - ga jibun_{i/j} - o aisite inai koto - ga John_j - o gakkari-sase-ta.'
- Mary-NOM self-ACC loving is not that John-ACC distressed-made- past.
- The fact that Mary did not love herself/himself distressed John.

JQ52. The fact that Mary did not love herself distressed John.

JQ59. The fact that Mary did not love himself distressed John.

The respondents override the subject orientation rule, and accept instead the object orientation in which the reflexive is bound to John (JQ59).

In Japanese, under most conditions, there is a strong preference to co-reference the reflexive with a subject and long distance binding is acceptable, so both variants below should be acceptable.

(3) 'John_i - ga Bill_j - ni Peter_k - ga jibun_{i/*j/k} - o semeta - to itta.'

John-NOM Bill-to Peter-NOM self-ACC blamed-COMP said

John said to Bill that Peter blamed himself.

JQ16. John said to Bill that Peter blamed John.

JQ10. John said to Bill that Peter blamed Peter.

Surprisingly, the respondents reject the binding to the subject in JQ10, preferring the long distance binding to the subject in JQ16.

In Japanese the reflexive can be used for long distance binding. JQ48 and JQ57 should both be acceptable as one proposes binding to a topic, the other to a subject. The respondents find the topic in JQ48 (the long distance binding) acceptable, and reject the subject binding in JQ57.

(4) 'John_i - wa Mary_j - ga jibun_{i/j} - o aisite iru koto - o sitte ita.'

John-topic Mary-Nom self-Acc is loving that knowing was

John knew that Mary loves himself/herself

JQ48. John knew that Mary loves himself.

JQ57. John knew that Mary loves herself.

Principle B and bound variables

According to my informants the three examples below should be ambiguous. The respondents found both versions unacceptable for all three.

(5) 'John_i - ga Bill_j - ni kare_{i/j} - ga siai - ni katta - to itta.'

John-Nom Bill-Dat self-Nom that game-Dat won-COMP said

JQ23. John said to Bill that Bill won the game.

JQ28. John said to Bill that John won the game.

(6) 'John_i - ga Peter_j - ni kare_{ij} - ni tsuite hanashita.'

John-Nom Peter-Dat he- Dat about spoke.

JQ5. John spoke to Peter about Peter.

JQ26. John spoke to Peter about John.

(7) 'Mary_i - ga kanozyo_{ij} - ga tensai-da to omotte-iru.'

Mary-Nom she- Nom genius-COP COMP think-Present

EQ44. Mary thinks that Mary is a genius.

EQ55. Mary thinks that Mary's mother is a genius.

In a three way ellipsis in Japanese two interpretations are supposed to be acceptable: the sloppy one (EQ25), and the subject comparison (EQ8). The only interpretation accepted by the respondents is the sloppy one.

(8) 'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'

Peter- Top Paul than himself-Acc skilfully speak in defense of

EQ25. Peter defends himself better than Paul defends Paul.

EQ8. Peter defends himself better than Peter defends Paul.

In Japanese it does not appear feasible to co-reference the pronoun with the nearest subject in the sentence, so JQ35 should not be more than marginally acceptable.

(9) '*Mary_i - ga shiken-ni ochi-ta node, kanozoyō_i - wa totemo zannengat-ta.'

Mary-NOM test-DAT fail-PAST because she-TOP very regret-PAST

'Because Mary_i failed the test, she_j was very unhappy.'

JQ35. Because Mary failed the test, Mary was very unhappy.

JQ47. Because Mary failed the test, Mary's mother was very unhappy.

In fact the respondents fully accept JQ35, and 50% of them also accept JQ47. This is the one and only example in which a significant number of people using the Japanese language questionnaire accept ambiguity.

The respondents to the Japanese questionnaire agree in rejecting ambiguity with the exception of some in one of the pairs involving pronouns (JQ55 & JQ47). Given that the different interpretations for any given pair were presented one at a time and with other items intercalated, the consistency of bilinguals and monolinguals in sticking to one interpretation is surprising. Although Japanese monolinguals with a more advanced knowledge of English show significantly more acceptance of many items compared to their peers (as per the Mann-Whitney test), they never go as far as to actually accept more

than one interpretation for any ambiguous statement. It would be interesting to establish whether syntactic ambiguity is a default in some languages but not others or whether the default is no ambiguity and accepting it is something that is culturally acquired.

5.2.3 The disagreeing monolinguals

While, as per the literature, inconsistencies (monolinguals not agreeing with each other) as well as some self-inconsistencies (individuals giving some widely disparate responses on repeat tests) are to be expected in the monolingual groups, the percentages encountered were somewhat surprising. The tests on self-consistency were not planned prior to the data-collection trip to Japan. The idea for them arose out of an opportunity that presented itself at the time. As such they must be regarded more in the nature of exploratory tests.

At least 33% of the Anglophones disagree with the majority on 23% of the items. This is also the case for 28% of the Japanese monolinguals. While the existence of inconsistencies was as expected, the high percentage of items exhibiting inconsistencies was unexpected.

Self-consistency tests were carried out only for Japanese monolinguals. Two groups were involved, both of which were tested twice within an interval of two weeks. The first group was given the questionnaire in the forward direction both times, the second once in the reverse, once in the forward direction. Self-consistency can be analysed along two dimensions. The first, by item, indicates that 52% of the items exhibited less than 70%

consistency in answers from at least one group of participants; with 23% of the items from both groups exhibiting less than 70% consistency. The second dimension refers to the consistency of individuals. This ranged between 57% and 93% with a mean of 72% for both groups.

5.3 Interpreting the findings

5.3.1 Bilinguals versus monolinguals

The original hypothesis was that given that Japanese and English belong to different language families and are typologically dissimilar the bilinguals will experience no language interference. This has turned out not to be the case. Assuming that this data can be understood in the context of the theory of Principles and Parameters as it stands (with the specified features), two possible scenarios are possible. The first is that parameters for the bilinguals and the monolinguals are set the same way and significant differences are the result of the input monitor in operation. The second is that due to a language learning process which differs between bilinguals and monolinguals the former end up with a slightly different set of parameters.

Same parameters

Although an input processing monitor is assumed to exist there is evidence that parallel processing of the input in both languages is taking place (see chapter 1). Thus judgements based on both languages may be available. When presented with input that does not make sense or is ungrammatical in one language, the monitor may well turn to the other

language. Whether this is judged as a competence or a performance problem would depend on how the monitor is classified.

Different parameters

Another way of explaining language interference would be to attribute it to the language learning process which leaves the bilinguals with parameters slightly different from those of the monolinguals. One could postulate that simple rules are assimilated easier than complex ones. If so, it may be that bilinguals will show no difference from the monolinguals in applying a simple rule, but will exhibit significant differences when a more complex rule is in operation.

In the P&P approach, a complex rule would be expressed by a set of parameters rather than just one as for a simple rule.

Like subjacency (see section 2.5.1), rules involving c-command and the binding domain require more subtle judgements than, say, use of the definite article, and in some, but not all cases, the bilinguals exhibit significant differences from the monolinguals. However significant differences occur as well for pro-drop which on the face of it is a simple rule. The data do not appear to support the hypothesis. Note, however, that which rules are simple and which are complex and require subtle judgements is a theory – internal issue.

The order of acquisition may have an impact on the extent to which bilinguals assimilate certain rules. In other words they assimilate fully rules which are acquired early, but not those which are acquired later. Acquisition of these rules requires the setting of one or

more parameters to the appropriate value. If such a process were in operation, we would find significant differences between monolinguals and bilinguals in rules that are acquired later (see 2.5.2).

Studies covered in 2.5.2 indicate however that late acquisition of certain rules governing anaphora is unlikely, making it an unlikely cause for the differences exhibited by bilinguals versus monolinguals in this domain of grammar. Note that even if some late acquisition was involved, this would not necessarily provide an explanation, as acquisition for bilinguals may follow a slightly different pattern.

While one or a combination of these approaches may be adequate for explaining the significant differences arising between monolinguals and bilinguals in the domain of anaphora, they do not help us with interpreting the discrepancies between the actual and expected results for the monolinguals or with the high level of inconsistencies and self-inconsistencies encountered in the monolinguals.

5.3.2 Actual versus expected results

In addressing the difference between actual and expected results a number of possibilities come to mind. The first is that we are dealing with performance error and P&P and its features are correct as they stand. The second is that P&P is adequate in principle but the chosen features and the rules that go with them are not. Another possibility is that P&P is at least by itself inadequate.

In some circles there is an automatic tendency to assume, whenever an empirical result differs from the theory that this is due to a performance error on the part of the respondents. This does not necessarily refer to noise (which would be taken care of by using statistical methods to analyse the collected data, as well as by rigorous experimental methodology). It refers rather to the fact that competence as viewed via validity judgements is filtered through performance systems, such that the collected data reflects in part facts about these systems, rather than about competence. A case in point would be the way grammar is taught at school. If someone is taught rigid rules about what is and what is not acceptable, they would find it difficult to accept anything that might contradict, or appear to contradict these rules. This would fit in with the fact that Japanese monolinguals reject far more items deemed acceptable in the literature and/or by my Japanese linguist informants than their monolingual counterparts, as grammar is taught far less in the English-speaking than in the Japanese-speaking schooling system.

A different explanation could be that the statistical model used is inappropriate. The model does not require a normal distribution. It does assume that the samples exhibit the same variance. Since the tests have the same range in both groups, the equality of variances assumption is reasonable. It also requires independent observations and it assumes that the dependent variable is continuous, so that there are few tied scores in the data. While the requirement for independent observations is fulfilled, that for very few tied scores is not. This biases the test results in favour of the null hypothesis (no difference between the samples being compared). In turn this lends more weight to the results found significant by the test.

Most of the discrepancies in Japanese between actual and expected are connected to the rejection of ambiguity. A tempting explanation would be to say that Japanese speakers, whether bilinguals or monolinguals, have a grammar in which ambiguity is not accepted. It is, however, difficult to see how this would be implemented as a mechanical feature. The various interpretations to given sentences are presented one at a time, rather than as multiple choice. The various interpretations do not follow each other, other sentences are interspersed, acting in some sense as fillers. No specific order for rejection or acceptance appears to be in operation; at times the first interpretation is accepted, at other times the second. The different order of presentation between the two Waseda groups has no impact on these judgements.

Another possible assumption could be that accepting ambiguity is a learned phenomenon, brought on by maturity and education (including learning a second language like English and maybe even linguistics). This would fit in with Japanese linguists accepting ambiguity where their 'naïve' counterparts don't, and with the tendency in the respondents to show an inverse correlation between stringency in their judgements and their knowledge of English. However, the fact that bilinguals responding to the Japanese questionnaire accept ambiguity as little as their monolingual counterparts, and that younger bilinguals tend overall to be less stringent than the older ones, seems to indicate that maturity and knowledge of English are not necessarily at the root of the phenomenon. On the other hand, maturity and education as determining factors may be applicable to Japanese monolinguals only, as the bilinguals are from the beginning

familiar with two languages. It may be revealing to carry out some specific further tests on Japanese monolinguals (see 5.5.4).

There is always also the possibility that the respondents are using some criteria we have not identified. For English one such criterion could be to choose the subject oriented version, unless forced to do otherwise by agreement. For Japanese, one such criterion could be to use the long distance subject, unless there is a psych verb involved.

A further possibility could be based on a development of the deictic approach by Iida (1996). On this view there can only ever be one single acceptable perspective in Japanese, at least whenever anaphora is involved. This would have as a natural consequence that respondents to the Japanese questionnaire would accept no ambiguity. This would need further investigation, to identify how the deictic perspective choice acts to eliminate all but one possible antecedent in any one circumstance. This approach, however, would still not explain why Japanese linguists have no hesitation in recognising ambiguity.

A distinction that should be made in analysing data is the distinction context/context free. Our experiment used solely context free data. According to Keller (2000) the judgement of acceptability of isolated sentences shows little, if any, variability between a context and a context free environment.

Another distinction that must be considered is the spontaneous versus the reflective response. There is a school of thought that considers reflective responses to be a closer

reflection of competence than spontaneous responses. On the other hand, spending too much time looking at the same sentence or wondering how a word is spelt has the effect of leaving people completely uncertain, and of making them accept as valid things which are not. So perhaps three categories ought to be distinguished: spontaneous, reflection and over-reflection. We know of no way to distinguish between reflection and over-reflection in a repeatable, measurable way. In fact, what is reflection for some constructions may prove to be over-reflection for others.

There are some indications that at least some of the discrepancies between actual and expected may be due to an error in the theory. The possible interpretation of ellipsis in English is a case in point. According to Sels, Zaenen & Zec (1987) English ellipses that include reflexives exhibit three acceptable interpretations: sloppy, strict and object comparison:

(13) *'John defends himself better than Peter (defends himself)'* ('sloppy')

John defends himself better than Peter (defends him, John) ('strict')

John defends himself better than (he, John defends) Peter ('object comparison')

The monolinguals and the bilinguals alike accept the 'sloppy' interpretation and reject the other two.

Kennedy & Lidz (2001) (see 2.5.4) review this construction in a paper on a long distance anaphora in English. They claim that the strict interpretation in elided clauses is blocked when the subject of the comparative clause is a name, or a pronoun. The strict interpretation in the example above would therefore be unacceptable, which corresponds with our findings (the 'object comparison' is not addressed in the paper).

5.3.3 Inconsistencies and lack of self-consistency across monolinguals

While the disagreement between the monolinguals for a large number of items could be explained by slight variations in parameter setting, the lack of self-consistency when tests are repeated can not.

It could be that judgement, while our best access to competence, is not equal to competence and may be impacted by extraneous cognitive factors, such as respondent's mood, test mode, etc. While the experiment was run under conditions as controlled as possible, including an attempt to set the mood via a light-hearted priming text, the impact of this on individuals is perforce limited. While some of this would also have an impact on the self-consistency area, it does not appear sufficient to explain the large variations in judgements observed.

A large proportion of the literature on the subject of consistency and self-consistency is surveyed in Schütze (1996). While there appears to be general agreement among linguists that individual judgements vary widely across individuals and across time for any given individual, the tests quoted were largely less than stringent from a methodological point of view than these here (more details on methodology are to be found in section 3 of this thesis).

Among those who have taken methodological issues seriously are Nagata (1989) and Cowart (1996). Both of them conclude that there is a strong correlation between the answers given by subjects to repeat presentations of the same tests (see 2.5.3).

Given the fact that these findings do not agree with either general opinion, or the results of the present thesis, this is an area that would benefit from further research.

5.4 Implications for the underlying grammatical model

There seem to be three possible approaches: a transformational grammar approach, based on some model of UG (P & P, Minimalist Program, etc.), a probabilistic approach, which involves information theory based learning (and presumably involves an innate learning mechanism), and some sort of mixture of the two, where a model of UG in the background is combined with a statistical approach. In simplified terms, one could look at the example of languages with prepositions versus languages with postpositions. In English solely prepositions are used, in Japanese solely postpositions. There are, however, languages where a mixture applies. In a parametric approach, for example, a parameter will be set to yes or no to indicate the use of prepositions or postpositions and a mixed system would require some different treatment.

In a probabilistic approach based on UG, this could be expressed as a function of probabilities. Assume p to be the probability for the use of prepositions, and q the probability for the use of postpositions. For languages using prepositions we would then have $p=1$ and $q=0$, for languages using postpositions $p=0$ and $q=1$, and for mixed systems p and q would have a value between 0 and 1 but whose sum adds up to 1. This approach allows all languages to be treated the same way. Note that p and q differ from parameters as understood in P&P who can only have a binary value.

There is a fairly large body of research indicating that human sentence processing involves some statistically based processes (Crocker, Pickering & Clifton 2000). While the latter refers mainly to the semantic interpretation of lexically ambiguous items, there is no reason to limit the existence of such mechanisms to semantics only. Given this, there could be a statistical element in syntax both in language learning and language use. This would make the lack of consistency and self-consistency something to be expected rather than a surprise.

We have seen in the previous section that P&P as it stands could be used to explain significant differences between bilinguals and monolinguals. It can not, with its current features, provide an adequate explanation for the differences between expected and actual results. And, moreover, it has no way of catering for inconsistencies or self-inconsistencies, as the setting of parameters does not change, at least in adults, over an interval of two weeks. Out of the 57 items tested for consistency and self-consistency in Japanese 23 exhibit consistency across the monolinguals as well as self-consistency on repeat of the tests. It is not clear why this should be so, but it may point to some of the binding theory being driven by something akin to the P&P model, with the rest being driven by a statistical component..

5.5 Further topics for research

A number of areas would benefit from further investigations and some possible experiments for data collection and analysis are outlined in the following subsections. They fall into two categories. One category is oriented to specific problems. The further

investigations proposed are a direct result of issues touched upon in this thesis, including bilinguals' acquisition of anaphora, self-consistency, etc. The other category is model related. In this category, as well as proposing specific experiments, we raise some of the major problems that we expect will be encountered.

5.5.1 Bilinguals' acquisition of anaphora

A number of studies have been carried out on the Anglophones' and Japanese monolinguals' acquisition of anaphora. There is no certainty that what applies to monolinguals applies equally to children acquiring two languages at the same time. Also, acquisition may be affected by whether we are dealing with simultaneous or consecutive acquisition. It is possible that a child starting to learn a second language at an early age learns differently than one learning two languages from birth onwards.

Data collection experiments could be carried out with simultaneous and sequential bilinguals along the lines of experiments described in Lust (1986). These experiments are of a type well documented in the field, and consist of imitation tests and role playing tests (using characters well known to children from TV shows, e.g. Sesame Street). Not only is the design and administration of such tests well documented, but they can be applied even to young age groups (e.g. 3 years old). Similarly, truth – value judgement tests (Crain & Lillo – Martin, 1986) appear to be suitable for the very young and require less extraneous processing from the subjects than the previous two methods. Up-to-date instructions on setting up and carrying out experiments with young children are available in Crain & Thornton (1998) and Ritchie & Bhatia (1999).

5.5.2 Acquisition and ambiguity

The analysis of the data collected as part of this thesis appears to indicate that while Anglophones and bilinguals responding to the English questionnaire accept ambiguity, neither Japanese monolinguals nor bilinguals responding to the Japanese questionnaire do. On the other hand, younger bilingual subjects (aged 11-12) appear more tolerant than their older counterparts of a large number of constructions and interpretations, although they never go as far as to accept ambiguity. Imitation tasks and role playing tasks could be administered to monolinguals and bilinguals of various ages (having trained them first in the possibility of ambiguity). This ought to indicate whether children start with a default parameter set, e.g. no ambiguity allowed, whether this default is the same in different languages, how bilingualism affects it and whether the setting of the parameter changes with maturity. It may also be possible to adapt the reading test used for checking the identification of lexical ambiguity (Crocker, Pickering and Clifton 2000). This test is based on the subjects' reading speed slowing down upon encountering a lexical ambiguity. Provided kana script was used for Japanese, reading tests could be administered to children say 8 and above incorporating paragraphs with ambiguous anaphora.

5.5.3 Consistency tests

The consistency tests carried out as part of this thesis were an attempt at answering the question of whether subjects were self-consistent when judging anaphora.

Systematic consistency tests would involve Anglophones as well as Japanese monolinguals. They would be divided into a number of groups, and the tests would be

repeated at various intervals. Additionally, to avoid the onset of automaticity, it would probably be useful to insert items not related to anaphora, which could be changed from test to test. The order of presentation of statements could be varied as well, although this will require a more elaborate data collation mechanism.

5.5.4 Ambiguity and acquisition of English

These tests would be directed at Japanese monolinguals' acceptance of ambiguity as a function of maturity and education.

The data would be collected from the following Japanese monolingual groups: 1st year English University students at the start of the year, English graduates, MAs, PhDs, Linguistics graduates. The aim of the test would be to establish any statistically significant differences between these groups as far as the acceptance of ambiguity is concerned. An additional possibility would be to repeat the tests during people's education, say once a year, by varying the order of stimuli and/or the fillers.

5.5.5 Differential ability in bilinguals to match monolinguals

Johnson & Newport (1989, 1991) reported the results of two studies concerning the ultimate attainment of certain language-specific structures by speakers of Chinese and Korean learning English as their second language (see 2.5.1). Some of the subjects came in contact with their second language between the ages of 4 and seven and as such seem to fall within the parameters of sequential balanced bilinguals as defined in this thesis.

These two experiments together appear to indicate that some areas are more likely than others to incur judgements that differ between bilinguals and monolinguals. The number of subjects between the ages of 4 and 7 is not reported; they are part of a group of under 16s that total some twenty subjects. Their backgrounds are not homogeneous. We would, therefore, suggest that the results of these experiments (which were intended to explore critical period effects in second language acquisition), need to be taken as indicative, rather than conclusive for our purposes.

The results of this thesis indicate that, in the domain of anaphora, bilinguals follow similar, but not identical rules to monolinguals. Further research to establish whether this is the case for other areas of syntax or semantics would increase our knowledge in the domain of language storage and processing as well as acquisition for balanced bilinguals. This, in turn, will shed additional light on these processes for the monolinguals. The question of full access to UG during acquisition of two languages, whether concomitant, or sequential, would also receive some answers.

5.5.6 Impact of early active age

There are researchers, e.g. Hyltenstam (2000), who maintain that no bilingual attains monolingual-like proficiency in a language he or she has started using actively after the age of 3. This claim could be tested using procedures very similar to the ones presented here. The main difference would be that advance screening using a socio-linguistic questionnaire would need to be carried out to ensure a balance in the number of

bilinguals in the 4 groups (e.g. J/E, E/E, E/J, J/J) as well as in the active age distribution (before 3 and after 3).

5.5.7 Statistical versus non-statistical approaches

Our knowledge of brain organisation and functioning in the domain of language and our understanding of language acquisition are not advanced enough to allow a definitive statement to be made on whether statistical or non-statistical approaches are more suitable. Below are a number of questions that may be worth pursuing in the attempt of throwing some light on the matter:

- It appears from both the current and other people's experiments that the degree of disagreement across constructions varies considerably. What causes small rather than large variations?
- Given idiolectal variation is observable even within a family, what is an acceptable degree of disagreement? At what point does this indicate a statistical component at play?
- In language loss there is at least anecdotal evidence that 'subtle' judgements are affected first. Is this indeed the case? And what characterises a 'subtle' judgement?

5.6 Summary of findings

The results of our experiment indicate that, at least in the domain of anaphora, the bilinguals have two sets of rules, one for each of their languages. These rules are similar, but not identical, to those of the monolinguals. Attempts to explain these differences have not been fully satisfactory. A number of experiments have been proposed to further explore the issues involved.

A number of discrepancies have been found between the expected and the actual results. It is possible that some of these discrepancies might indicate that the theory is wrong (e.g. as far as ellipsis are concerned). Most of the discrepancies are in the domain of ambiguity, with both respondents to the English, and the Japanese questionnaires less willing to accept ambiguity than expected. In particular, one of the most unexpected results of this thesis has been the apparent inability of respondents to the Japanese questionnaire to accept ambiguity at all. This happened in spite of the fact that Japanese linguists have no such difficulty, and despite training given prior to the questionnaire being completed. The respondents to the English questionnaire, while able to cope with ambiguity, nevertheless show an unexpected tendency to prefer subject orientation for the reflexive. We have put forth some possible explanations relating to grammar learned at school, maturity, or even the use of some additional rules undistinguished as such. This is clearly an area that would benefit from more research, and some proposals have been made to this effect.

None of the approaches examined (except for the statistical approaches), have anything to say about the lack of consistency in monolinguals' answers to some constructions, or about the lack of self-consistency encountered in Japanese monolinguals. However, many researchers now believe that whatever types of knowledge and processing underlie linguistic behaviour, it will always manifest an irreducible element of statistical variation. For example Crocker, Pickering & Clifford (2000) state that the human sentence processing mechanism is at least partially statistical in nature, based on either a tuning

hypothesis or a constraint based micro-level linked to a connectionist architecture. It can, therefore, be hypothesised that in syntax too, and specifically in the domain of anaphora, we are dealing with abstract knowledge (as expressed by P&P Theory) accompanied by a component whose operation shows some sort of statistical behaviour. The statistical component would be a result of learning experience and would by its nature vary between individuals. The very fact of its existence would also explain the inconsistencies encountered when individuals are asked to do the same test twice.

Appendix A - chi test results/questions correspondence

This appendix contains the distilled results of the chi-square tests on the main data. It compares English/Japanese bilinguals to their respective monolinguals. (Delaware and Waseda Tokyo ben, forward only) The following notation is used:

A = acceptable; N = not acceptable; M = marginal but acceptable (i, j = 2 groups, i is the larger and the smaller group is more or = 1/2 the larger otherwise assume one group with exceptions)

In the C column, n indicates the start of a family of questions, d indicates the current question duplicates the construction above it using different lexical items.

In the TY column L stands for locality, E for elided clauses, ES for experiencer subject, EO for experiencer object, BB for backward binding, NA for no antecedent, AG for agreement, M for modifiers, EM for empathy and LP for little pro.

In the MD column, a1-a4/b1-b4 indicate whether the Japanese monolingual duplicate tests found significant differences and their degree (1 – 60-69% consistency, 2 – 50-59%, 3 40-49%, 4 under 40%). (a for fwd/fwd, b for rev/fwd)

R stands for ‘received wisdom’, the answer expected as per literature. An ‘I’ underneath indicates statistical significant inconsistencies in responses to the forward and reverse versions of the questionnaires for Japanese or English monolinguals.

This is followed by the answer to the reverse version in small letters.

* indicates a significant difference found by the Mann - Whitney test at 5%, +N following an ‘*’ indicates this category found the statement more unacceptable, +A more acceptable, than the appropriate monolinguals.

TY	MD	JQ	JUDGEMENTS	R	C	EQ	JUDGEMENTS	R
L		7	J A J/J E/J	A	n	5	E A E/E J/E	A
		---			d	16	E A E/E J/E	A I
		15	J N J/J E/J	N		9	E N E/E J/E E+J	A
		---			d	23	E N,A E/E J/E E+J	A
		9	J A J/J E/J	A	n	8	E A E/E J/E	A
		---			d	12	E A E/E J/E	A
		13	J N J/J E/J E+J	N		17	E N,A E/E J/E E+J	A
	b1	11	J A,N J/J E/J	A	n	----		
	b1	17	J N J/J E/J	N I n, a		----		
	a1 b2	12	J N J/J E/J	A	n	----		
	a2 b1	18	J A=N J/J E/J	A I a		----		
		14	J A J/J E/J	A	n	10	E N,A E/E J/E	N
		6	J N J/J E/J	N		36	E N E/E J/E	N

		34	J A J/J E/J	A	n	----		
	b1	16	J A J/J E/J	A	n	19	E N E/E *+A J/E E+J *+A	N
		---			d	13	E N E/E *+A J/E	N
	b1	20	J N J/J E/J	N		25	E N E/E J/E	N
		---			d	21	E N E/E J/E	N
	a2	10	J N,A J/J E/J	A		34	E A E/E J/E	A
		---			d	4	E A E/E *+N J/E E+J *+N	A
	b1	24	J N J/J E/J	N	n	----		
		4	J N J/J E/J	N		----		
	b1	29	J A J/J E/J	A		----		
		27	J N J/J E/J *+A E+J *+A	M I n	n	27	E A,N E/E J/E	N
		---				32	E A E/E J/E	A
		53	J N J/J E/J	M	n	57	E N,A E/E J/E	N ?
	a2	58	J A,N J/J E/J	A		48	E A E/E J/E	A

		45	J A J/J E/J	<i>A</i> <i>I</i> <i>a</i> , <i>n</i>	<i>n</i>	----		
		46	J N,A J/J E/J	<i>A</i> <i>I</i> <i>a</i> , <i>n</i>	<i>n</i>	----		
		54	J N J/J E/J	<i>N</i>		----		
P	a2 b4	28	J N J/J *+A E/J	<i>A</i>	<i>n</i>	6	E A E/E *+A J/E E+J *+A	<i>A</i>
		23	J N J/J *+A E/J *+A E+J *+A	<i>A</i>		24	E A E/E J/E	<i>A</i>
	a2 b1	26	J N J/J E/J	<i>A</i>	<i>n</i>	31	E N E/E *+A J/E E+J *+A	<i>N</i>
	a1 b1	5	J N J/J E/J E+J	<i>A</i>		37	E N=A E/E J/E E+J	<i>N</i>
		---				28	E A E/E J/E	<i>A</i>
	a1	38	J N J/J E/J	<i>N</i>	<i>n</i>	58	E A E/E J/E *+N J+E *+N	<i>A</i>
	b1	22	J A,N J/J E/J	<i>A</i>		58	E A E/E J/E *+N E+J *+N	<i>A</i>
	a1 b3	44	J N J/J E/J	<i>A</i> <i>I</i> <i>n</i>	<i>n</i>	52	E A E/E J/E	<i>A</i> <i>I</i>
	b1	55	J N J/J E/J	<i>A</i>		52	E A E/E J/E	<i>A</i>
		35	J A	<i>M</i>	<i>n</i>	38	E A	<i>A</i>

			J/J E/J * +N				E/E J/E	I
	a2 b1	47	J A=N J/J E/J	A		38	E A E/E J/E	A
		---			n	11	E A,N E/E J/E	A
		---				29	E A E/E J/E	A
		---				15	E N E/E J/E	N
		---			n	20	E A E/E J/E	A
		---				35	E N,A E/E J/E	N
E	a3 b2	25	J A J/J E/J E+J	A	n	18	E A E/E J/E	A
	a2 b4	30	J N J/J E/J	N		7	E N,A E/E J/E E+J	A
	b3	8	J N,A J/J E/J E+J	A		30	E N,A E/E J/E *+N	A
		---			d	14	E N E/E J/E E+J	A
	a1 b1	21	J A J/J E/J * +N	N	n	22	E A E/E J/E	A
	a1 b2	19	J N,A J/J E/J * +A	A		33	E A,N E/E J/E	A

		---			d	26	E A=N E/E J/E E+J	A
SBes					n	40	E A E/E J/E	A
		48	J A J/J E/J * +N E+J * +N	A	n	---		
		57	J N J/J * +N E/J	A I n		---		
		---			n	43	E A E/E J/E	N
BB		37	J A J/J E/J	A	n	41	E N E/E J/E	N
		31	J A J/J * +N E/J E+J * +N	A	n	51	E N E/E J/E	N
	a1 b2	50	J A J/J E/J	M	n	47	E A E/E J/E	A
		---				39	E A,N E/E J/E	A
	b1	51	J A J/J E/J	M I a	n	49	E A,N E/E J/E	A
		---			d	60	E A E/E J/E	A
		56	J A,N J/J E/J	A	n	42	E N,A E/E J/E	N
	b1	49	J A,N J/J E/J	A	n	---		

	a1	52	J N J/J E/J	A	n	---		
	a1 b1	59	J A,N J/J E/J	A		---		
NA	a1	32	J N,A J/J E/J	A	n	54	E A,N E/E J/E	M
		---			n	45	E A E/E J/E	A
		---				59	E A E/E J/E	A
		---				53	E A,N E/E J/E	N
AG		---			n	55	E A E/E J/E	A
						46	E A E/E *+N J/E *+N E+J *+N	A
		39	J A J/J E/J	A	n	----		
	b1	43	J N J/J E/J E+J	N I n		50	E A E/E J/E	A
		33	J A J/J E/J	A	n	----		
		41	J A J/J * +N E/J E+J * +N	A		----		
M		40	J A J/J E/J	A	n	56	E N E/E J/E *+A	N

							E+J	
		---				44	E A,N E/E *+N J/E	A
EM		42	J A J/J E/J	A	n	----		
		36	J N J/J E/J E+J	N		----		
LP	a2 b2	60	J A,N J/J E/J * +N	A	n	---		

Appendix B – statistically significant tests bilinguals/monolinguals

Significance level for the Mann-Whitney tests set at 5%. Given that a score of 6 indicates an item has been judged as fully acceptable, while a score of 1 indicates it has been judged as fully unacceptable, a higher mean ranking by a group indicates the item has been found more acceptable by that group than by the group it is being compared to.

Bilinguals J/J (active age less than 7) versus Waseda monolinguals (forward, Tokyo ben only).

Question no.	N	Mean rank	Mann-Whitney U	Asymp. Sig.(2-tailed)	Comments
JQ23 J/J	19	23.37	107.00	0.028	J/J * +A
J mono	19	15.63			
Total	38				
JQ28 J/J	19	23.42	106.00	0.027	J/J * +A
J mono	19	15.58			
Total	38				
JQ31 J/J	18	14.03	81.50	0.013	J/J * +N
J mono	17	22.21			
Total	35				
JQ41 J/J	17	14.32	90.50	0.022	J/J * +N
J mono	19	22.24			
Total	36				
JQ57 J/J	20	16.85	127.00	0.039	J/J * +N
J mono	20	24.15			
Total	40				

Bilinguals E/J (active age less than 7) versus Waseda monolinguals (forward, Tokyo ben only).

Question no.	N	Mean rank	Mann-Whitney U	Asymp. Sig.(2-tailed)	Comments
JQ19 E/J	15	20.50	66.00	0.018	E/J * +A
J mono	17	12.88			
Total	32				
JQ21 E/J	16	13.50	80.00	0.04	E/J * +N
J mono	17	20.29			
Total	33				
JQ23 E/J	16	21.75	92.00	0.042	E/J * +A
J mono	19	14.34			
Total	35				
JQ27 E/J	15	22.07	72.00	0.08	E/J * +A
J mono	19	13.89			
Total	34				
JQ35 E/J	16	13.78	84.50	0.023	E/J * +N
J mono	19	21.55			
Total	35				
JQ48 E/J	16	12.41	62.50	0.001	E/J * +N
J mono	20	23.38			
Total	36				
JQ60 E/J	13	11.58	59.50	0.012	E/J * +N
J mono	19	19.87			
Total	32				

Bilinguals J/J + E/J (active age less than 7) versus Waseda monolinguals (forward, Tokyo ben only).

Question no.	N	Mean rank	Mann-Whitney U	Asymp. Sig.(2-tailed)	Comments
JQ23 J/J+E/J	35	31.31	199.00	0.014	J/J+E/J * +A
J mono	19	20.47			
Total	54				
JQ27 J/J+E/J	34	29.97	222.00	0.034	J/J+E/J * +A
J mono	19	21.68			
Total	53				
JQ31 J/J+E/J	34	22.54	171.50	0.015	J/J+E/J * +N
J mono	17	32.91			
Total	51				
JQ41 J/J+E/J	32	22.69	198.00	0.035	J/J+E/J * +N
J mono	19	31.58			
Total	51				
JQ48 J/J+E/J	37	25.43	238.00	0.021	E/J+J/J * +N
J mono	20	35.60			
Total	57				

Bilinguals E/E (active age less than 7) versus Delaware monolinguals.

Question no.	N	Mean rank	Mann-Whitney U	Asymp. Sig.(2-tailed)	Comments
EQ4 E/E	15	12.47	67.00	0.009	E/E * +N
E mono	18	20.78			
Total	33				
EQ6 E/E	17	21.26	97.50	0.049	E/E * +A
E mono	18	14.92			
Total	35				
EQ13 E/E	17	21.44	94.50	0.047	E/E * +A
E mono	18	14.75			
Total	35				
EQ19 E/E	17	22.21	81.50	0.015	E/E * +A
E mono	18	14.03			
Total	35				
EQ31 E/E	16	23.47	48.50	0.001	E/E * +A
E mono	18	12.19			
Total	34				
EQ44 E/E	17	13.62	78.50	0.012	E/E * +N
E mono	18	22.14			
Total	35				
EQ46 E/E	17	14.41	92.00	0.037	E/E * +N
E mono	18	21.39			
Total	35				

Bilinguals J/E (active age less than 7) versus Delaware monolinguals.

Question no.	N	Mean rank	Mann-Whitney U	Asymp. Sig.(2-tailed)	Comments
EQ30 J/E	13	11.88	63.50	0.029	J/E * +N
E mono	18	18.97			
Total	31				
EQ46 J/E	13	12.23	68.00	0.043	J/E * +N
E mono	18	18.72			
Total	31				
EQ56 J/E	11	19.41	50.50	0.022	J/E * +A
E mono	18	12.31			
Total	29				
EQ58 J/E	13	9.73	35.50	0.001	J/E * +N
E mono	18	20.53			
Total	31				

Bilinguals J/E + E/E (active age less than 7) versus Delaware monolinguals.

Question no.	N	Mean rank	Mann-Whitney U	Asymp. Sig.(2-tailed)	Comments	
EQ4	E/E +J/E	28	19.75	147.00	0.013	E/E+J/E * +N
	E mono	18	29.33			
	Total	46				
EQ6	E/E +J/E	31	27.90	189.00	0.042	E/E+J/E * +A
	E mono	18	20.00			
	Total	49				
EQ19	E/E +J/E	29	27.29	165.50	0.033	E/E+J/E * +A
	E mono	18	18.69			
	Total	47				
EQ31	E/E +J/E	28	28.41	114.50	0.02	E/E+J/E * +A
	E mono	18	15.86			
	Total	46				
EQ46	E/E +J/E	30	20.83	160.00	0.016	E/E+J/E * +N
	E mono	18	30.61			
	Total	48				
EQ58	E/E +J/E	29	19.55	132.00	0.003	E/E+J/E * +N
	E mono	18	31.17			
	Total	47				

Appendix C – socio–linguistic questionnaires

English questionnaire

1. Mary crosses street.

2. Mary gives Ann her book.

= Mary gives Ann Mary's book.

3. Mary gives Ann her book.

= Mary gives Ann Ann's book.

4. Mary told Paula that Ann blamed herself.

= Mary told Paula that Ann blamed Ann.

5. John talked to Bill about himself.

= John talked to Bill about John.

6. John told Bill that he won the game.

= John told Bill that John won the game.

7. Peter defends himself better than Paul.

= Peter defends himself better than Paul defends Peter.

8. John showed Bill a picture of himself.

= John showed Bill a picture of John.

9. John talked to Bill about himself.

= John talked to Bill about Bill.

10. John told Bill that himself won the game.

= John told Bill that John won the game.

11. John told Bill that Peter blamed him.

= John told Bill that Peter blamed John.

12. Mary showed Ann a picture of herself.

= Mary showed Ann a picture of Mary.

13. Mary told Paula that Ann blamed herself.

= Mary told Paula that Ann blamed Mary.

14. Mary defends herself better than Ann.

= Mary defends herself better than Mary defends Ann.

15. John told Bill that Peter blamed him.

= John told Bill that Peter blamed Peter.

16. Mary talked to Ann about herself.

= Mary talked to Ann about Mary.

17. John showed Bill a picture of himself.

= John showed Bill a picture of Bill.

18. Peter defends himself better than Paul.

= Peter defends himself better than Paul defends Paul.

19. John told Bill that Peter blamed himself.

= John told Bill that Peter blamed John.

20. John saw Peter's picture of him.

= John saw Peter's picture of John.

21. Mary told Paula that Ann blamed herself.

= Mary told Paula that Ann blamed Paula.

22. Peter defends Mary better than Paul.

= Peter defends Mary better than Paul defends Mary.

23. Mary talked to Ann about herself.

= Mary talked to Ann about Ann.

24. John told Bill that he won the game.

= John told Bill that Bill won the game.

25. John told Bill that Peter blamed himself.

= John told Bill that Peter blamed Bill.

26. Mary defends Paula better than Ann.

= Mary defends Paula better than Mary defends Ann.

27. John saw Peter's picture of himself.

= John saw Peter's picture of John.

28. Both John and Peter know Bill. John talks to Peter about him.

= John talks to Peter about Bill.

29. John told Bill that Peter blamed him.

= John told Bill that Peter blamed Bill.

30. Peter defends himself better than Paul.

= Peter defends himself better than Peter defends Paul.

31. John talks to Peter about him.

= John talks to Peter about John.

32. John saw Peter's picture of himself.

= John saw Peter's picture of Peter.

33. Peter defends Mary better than Paul.

= Peter defends Mary better than Peter defends Paul.

34. John told Bill that Peter blamed himself.

= John told Bill that Peter blamed Peter.

35. John saw Peter's picture of him.

= John saw Peter's picture of Peter.

36. John told Bill that himself won the game.

= John told Bill that Bill won the game.

37. John talks to Peter about him.

= John talks to Peter about Peter.

38. Because Mary failed the test, she was very unhappy.

39. Stories about herself amused my sister.

40. They frighten themselves.

41. Mitiko finally introduced the young man whom herself loved to her parents.

42. That book about herself struck Mary on the head.

43. John depresses himself.

44. John saw a new self in the mirror.

45. Take someone like myself... I never drink coffee.

46. John told Mary things about herself.

47. Pictures of himself amused the man.

48. John likes my stories about myself.

49. That book about herself struck Mary as embarrassing.

50. History repeats itself.

51. That herself might have cancer worried Mitiko.

52. Mary thinks that she is a genius.

53. People like himself are always drinking coffee.

54. Was it John who went to the party?

No, it was myself.

55. John told Mary things about himself.

56. John saw a new himself in the mirror.

57. John likes my stories about himself.

58. Every woman thinks that she is a genius.

59. People like him are always drinking coffee.

60. That book about himself struck John as embarrassing.

Japanese questionnaire gloss

(in the Kanji version the names have been replaced as follows:

John - Kenji; Paul - Koji, Peter - Kazuo, Bill - Hiroshi, Mary - Mari)

1. Watashi - no hon yomimasu.

2. Denwa - o kakemasuka?

= Ano hito - wa denwa - o kakemasuka?

3. Denwa - o kakemasuka?

= Anata - wa denwa - o kakemasuka?

*‘ John_i - ga Bill_j - ni Peter_k - ga jibun - zisin_{*i/*j/k} - o semeta – to itta.*

‘

John-Nom Bill-Dat Peter-Nom self- Acc blamed-COMP said

John said to Bill that Peter blamed Bill.

4. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga Bill - o semeta - to itta.

‘ John_i - ga Peter_j - ni kare_{i/j} - ni tsuite hanashita. ’

John-Nom Peter-Dat he- Dat about spoke.

John spoke to Peter about Peter.

5. John - ga Peter - ni kare - ni tuite hanashita.

= John - ga Peter - ni Peter - ni tuite hanashita.

*'John_i - ga Bill_j - ni jibun_i/*_j - ga siai - ni katta - to itta.'*

John-Nom Bill-Dat self- Nom that game-Dat won-COMP said

John said that Bill won the game.

6. John - ga Bill - ni jibun - ga siai - ni katta - to itta.

= John - ga Bill - ni Bill - ga siai - ni katta - to itta.

*'John_i - ga Bill_j - ni jibun_i/*_j - no koto- o hanashita.'*

John- Nom Bill-Dat self- Gen fact- Acc talked

John talked to Bill about John's matter

7. John - ga Bill - ni jibun - no koto - o hanashita.

= John - ga Bill - ni John- no koto - o hanashita.

'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'

Peter- Top Paul than himself-Acc skilfully speak in defense of

Peter defends himself better than (Peter defends) Paul.

8. Peter -wa Paul yori jibun - o umaku bengosuru.

**= Peter -wa Paul - o bengo suru yori jumaku jibun - o
bengosuru.**

*'John_i - ga Bill_j - ni jibun_i/*_j - no shashin - o miseta.'*

John-Nom Bil-Dat self- Gen photograph-Acc showed

John showed Bill a photograph of John.

9. John - ga Bill - ni jibun - no shashin - o miseta.

= John - ga Bill - ni John - no shashin - o miseta.

*'John_i - ga Bill_j - ni Peter_k - ga jibun_{i/*j/k} - o semeta - to itta.'*

John-Nom Bill-Dat Peter-Nom self- Acc blamed-COMP said

John said to Bill that Peter blamed Peter.

10. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga Peter - o semeta - to itta.

*'Mary_i - wa Bill_j - ni jibun_{i/*j} - no uchi de hon- o yoma-sa- re-ta.'*

Mary-Top Bil-Dat self- Gen house in book-Acc read-cause-passive-past

Mary was made by Bill to read the book in Mary's house.

11. Mary - wa Bill - ni jibun - no uchi de hon-o yoma-sa-re-ta.

= Mary - wa Bill - ni Mary - no uchi de hon-o yoma-sa-re-ta.

'Mary_i - wa Bill_j - ni jibun_{i/j} - no kazoku-no hanashi bakari sa-re-ta.'

Mary-Top Bil-Dat self- Gen family-Gen talk only do-Passive-Past

Mary was affected by Bill's talking only about Mary's family.

12. Mary - wa Bill - ni jibun - no kazoku-no hanashi bakari sa-re-ta.

= Mary - wa Bill - ni Mary - no kazoku-no hanashi bakari sa-
re-ta.

'John_i - ga Bill_j - ni jibun_i/*_j - no shashin - o miseta.'

John-Nom Bill-Dat self- Gen photograph-Acc showed

John showed Bill a photograph of Bill.

13. John - ga Bill - ni jibun - no shashin - o miseta.

= John - ga Bill - ni Bill - no shashin - o miseta.

'John_i - ga Bill_j - ni jibun_i/*_j - ga siai - ni katta - to itta.'

John-Nom Bill-Dat self- Nom that game-Dat won-COMP said

John said that John won the game.

14. John - ga Bill - ni jibun - ga siai - ni katta - to itta.

= John - ga Bill - ni John - ga siai - ni katta - to itta.

'John_i - ga Bill_j - ni jibun_i/*_j - no koto - o hanashita.'

John- Nom Bill-Dat self- Gen fact- Acc talked

John talked to Bill about Bill's matter.

15. John - ga Bill - ni jibun - no koto - o hanashita.

= John - ga Bill - ni Bill- no koto - o hanashita.

'John_i - ga Bill_j - ni Peter_k - ga jibun_i/*_j/_k - o semeta - to itta.'

John-Nom Bill-Dat Peter-Nom self- Acc blamed-COMP said

John said to Bill that Peter blamed John.

16. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga John - o semeta - to itta.

*'Mary_i - wa Bill_j - ni jibun_i/_j - no uchi de hon- o yoma-sa- re-
ta.'*

*Mary-Top Bil-Dat self- Gen house in book-Acc read-cause-passive-
past*

Mary was made by Bill to read the book in Bill's house.

17. Mary - wa Bill - ni jibun - no uchi de hon-o yoma-sa-re-ta.

= Mary - wa Bill - ni Bill - no uchi de hon-o yoma-sa-re-ta.

*'Mary_i - wa Bill_j - ni jibun_i/_j - no kazoku-no hanashi bakari sa-
re- ta.'*

*Mary-Top Bil-Dat self- Gen family-Gen talk only do-
Passive-Past*

Mary was affected by Bill's talking only about Bill's family

18. Mary - wa Bill - ni jibun - no kazoku-no hanashi bakari sa-re-ta.

**= Mary - wa Bill - ni Bill - no kazoku-no hanashi bakari sa-re-
ta.**

'Peter - wa Paul yori Mary - o umaku bengosuru.'

Peter- Top Paul than Mary- Acc skilfully speak in defense of

Peter defends Mary better than Paul (defends Paul).

19. Peter - wa Paul yori Mari - o umaku bengosuru.

= Paul - o bengo suru yori Mary - o umaku bengosuru.

*'John_i - ga Bill_j - ni Peter_k - ga jibun_{i/*j/k} - o semeta - to itta.'*

John-Nom Bill-Dat Peter-Nom self- Acc blamed-COMP said

John said to Bill that Peter blamed Bill.

20. John - ga Bill - ni Peter - ga jibun - o semeta - to itta.

= John - ga Bill - ni Peter - ga Bill - o semeta - to itta.

'Peter - wa Paul yori Mary - o umaku bengosuru.'

Peter- Top Paul than Mary- Acc skilfully speak in defense of

Peter defends Mary better than Paul (defends Mary).

21. Peter - wa Paul yori Mari - o umaku bengosuru.

= Peter - wa Paul -ga Mari - o bengo suru yori umaku Mari - o bengosuru.

*'Dono zyosei_i - mo kanozyo_{*i/j} - ga tensai-da to omotte-iru.'*

Every woman-also she- NOM genius-COP COMP think-PRES

Every woman thinks Mary is a genius.

22. Dono zyosei - mo kanozyo - ga tensai-da to omotte-iru.

= Dono zyosei - mo Mary - ga tensai-da to omotte-iru.

'John_i - ga Bill_j - ni kare_{i/j} - ga siai - ni katta - to itta.'

John-Nom Bill-Dat he- Nom game-Dat won-COMP said

John said to Bill that Bill won the game.

23. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni Bill - ga siai - ni katta - to itta.

*'John_i - ga Bill_j - ni Peter_k - ga jibun - zisin_{*i/*j/k} - o semeta - to itta.*

John-Nom Bill-Dat Peter-Nom self- Acc blamed-COMP said

John said to Bill that Peter blamed John.

24. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga John - o semeta - to itta.

'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'

Peter- Top Paul than himself-Acc skilfully speak in defense of

Peter defends himself better than Paul (defends Paul).

25. Peter - wa Paul yori jibun - o umaku bengosuru.

= Peter - wa Paul - ga Paul - o bengo sum yori umaku jibun - o bengosuru.

'John_i - ga Peter_j - ni kare_{i/j} - ni tsuite hanashita.'

John-Nom Peter-Dat he- Dat about spoke.

John spoke to Peter about John.

26. John - ga Peter - ni kare - ni tsuite hanashita.

= John - ga Peter - ni John - ni tsuite hanashita.

*'*John - ga Peter - no jibun - no shashin - o mita.'*

John- Nom Peter- Gen self - Gen photograph- Acc saw

John saw Peter's photograph of himself.

27. John - ga Peter - no jibun - no shashin - o mita.

'John_i - ga Bill_j - ni kare_{i/j} - ga siai - ni katta - to itta.'

John-Nom Bill-Dat he- Nom game-Dat won-COMP said

John said to Bill that John won the game.

28. John - ga Bill - ni kare - ga siai - ni katta - to itta.

= John - ga Bill - ni John - ga siai - ni katta - to itta.

*'John_i - ga Bill_j - ni Peter_k - ga jibun - zisin_{*i/*j/k} - o semeta - to itta.*

John-Nom Bill-Dat Peter-Nom self- Acc blamed-COMP said

John said to Bill that Peter blamed Peter.

29. John - ga Bill - ni Peter - ga jibun - zisin- o semeta - to itta.

= John - ga Bill - ni Peter - ga Peter - o semeta - to itta.

'Peter_i -wa Paul yori jibun_i -o umaku bengosuru.'

Peter- Top Paul than himself-Acc skilfully speak in defense of

Peter defends himself better than Paul (defends Peter).

30. Peter - wa Paul yori jibun -o umaku bengosuru.

= Peter -wa Paul - ga Peter - o bengo sum yori umaku jibun-
o bengosuru.

*'Jibun_i - ga gan kamo sirenai koto-ga Mitiko_i - o nayama-se-
ta.'*

*self- Nom cancer may have fact-Nom Mitiko-Acc worried-make-
past*

That self might have cancer worried Mitiko.

31. Jibun - ga gan kamo sirenai koto-ga Mitiko - o nayam-sase-ta.

*A: Dareka - ga John - no kawari - ni sono party - ni itta -
ndesu - ka.*

*Someone-Nom John-Gen place - Dat that party-Dat went-it
is that-Q*

Is it that someone went to the party instead of John?

B: Iie, jibun - de kita - ndesu.

No, self- Dat came-it is that

No, it is by self that came.

**32. A: Dareka - ga John - no kawari - ni sono party - ni itta -
ndesu - ka.**

B: Iie, jibun - de kita - ndesu.

'Gakusei - ga mina jibun - tachi - o semeta.'

student- Nom all self- pl- Acc blamed

All the students blamed themselves.

33. Gakusei - ga mina jibun - tachi - o semeta.

' John_i - ga jibun_i - no heya - de benkyo shita. '

John- Nom self- Gen room- in study- Past

John studied in his room.

34. John - ga jibun - no heya - de benkyo shiita.

*'Mary_i - ga shiken-ni ochi-ta node, kanozyo*_{i/j} - wa totemo zannengat-ta. '*

*Mary-Nom test- Dat fail-PAST because she- TOP very
regret- PAST*

Because Mary failed the test, Mary was very unhappy. '

35. Mary - ga shiken-ni ochi-ta node, kanozyo - wa totemo zannengat-ta.

**= Mary - ga shiken-ni ochi-ta node, Mary - wa totemo
zannengat-ta.**

*'*John_i - wa Peter -ga jibun_i - ni kasite yatta hon - o nakusite simatta.*

*John- Top Peter-Nom self- to lending gave book-Acc losing
ended up*

John has lost a book that Peter has lent him.

36. John - wa Peter -ga jibun - ni kasite yatta hon - o nakushite shimatta.

'Jibun_i - no sukina seinen- o Mitiko_i - wa yatto ryoasin-ni syookai - sita.'

self- Gen loved young man-Acc Mitiko-Top finally parents-Dat introduced -Past

Mitiko finally introduced the young man whom self loved to her parents

37. Jibun - no sukina seinen-o Mitiko - wa yatto ryoasin-ni syookai sita.

*'Dono zyosei_i - mo kanozyo*_{i/j} - ga tensai-da to omotte-iru.'*

Every woman-also she- NOM genius-COP COMP think-PRES

Every woman thinks she herself is a genius.

38. Dono zyosei - mo kanozyo - ga tensai-da to omotte-iru.

= Dono zyosei - mo jibun - ga tensai-da to omotte-iru.

'Kodomo - ga jibun - no uchi - e hasitte - itta'

child- Nom self- Gen home-to run- went

The child run to self's house.

39. Kodomo - ga jibun - no uchi - e hasitte - itta.

'John_i - ga kagami - no naka - ni atarashii jibun_i - o mituketa.'

John- Nom mirror-Gen inside-in new self- Acc found

John found a new himself in the mirror.

40. John - ga kagami - no naka - ni atarashii jibun - o mitsuketa.

'Gakusei - ga mina jibun - o semeta.'

student- Nom all self- Acc blamed

All the students blamed themselves.

41. Gakusei - ga mina jibun - o semeta.

*'John_i - wa Peter -ga jibun_i - ni kasite kureta hon - o nakusite
simatta.'*

*John- Top Peter-Nom self- to lending gave book-Acc losing
ended up*

John has lost a book that Peter has lent him.

**42. John - wa Peter -ga jibun - ni kasite kureta hon - o nakushite
shimatta.**

*'*Jidosha - ga jibun - no syako -no hoo - e hasiridashita.'*

car- Nom self- Gen garage-Gen direction-to began to run

The car began to move to self's garage.

43. Jidosha - ga jibun - no syako -no hoo - e hasiridashita.

'Mary_i - ga kanozyo_{ij} - ga tensai-da to omotte-iru.'

Mary-Nom she- Nom genius-COP COMP think-Present

Mary thinks that Mary is a genius.

44. Mary - ga kanozyo - ga tensai-da to omotte-iru.

= Mary - ga Mary - ga tensai-da to omotte-iru.

'Dono danse_i - mo jibun_i - ga eiyuu-da to omotte-iru.'

Every man- also himsef-NOM hero-COP COMP think-PRES

Every man thinks he is a genius.

45. Dono danse_i - mo jibun - ga eiyuu-da to omotte-iru.

*'John - to Paul_j -wa tomodachi da. John_i - ga jibun_{i/*j} - ga*

tensai-da to omotte-iru.'

John and Paul-Top friends COP. John-NOM himself-NOM genius-

COP COMP think-PRES

John and Paul are friends. John thinks John is a genius.

46. John - to Paul -wa tomodachi da. John- ga jibun - ga tensai-da

to omotte-iru.

= John - ga John - ga tensai-da to omotte-iru.

*'Mary_i - ga shiken-ni ochi-ta node, kanozyo_{*i/j} - wa totemo zannengat-ta.'*

Mary-Nom test- Dat fail-PAST because she- TOP very

regret- PAST

Because Mary failed the test, Mary's mother was very unhappy.'

47. Mary - ga shiken-ni ochi-ta node, kanozyo - wa totemo zannengat-ta.

= Mary - ga shiken-ni ochi-ta node, Mary - no okaasan - wa totemo zannengat-ta.

'John_i - wa Mary_j - ga jibun_{ij} - o aisite iru koto - o sitte ita.'

*John- Top Mary-Nom self- Acc loving is fact -Acc knowing was
John knew that Mary loves himself.*

48. John - wa Mary - ga jibun - o aisite iru koto - o sitte ita.

= John - wa Mary - ga John- o aisite iru koto - o sitte ita.

'Jibun_i - ga baka na koto-ga John_i - o kanasima-se-ta.'

*self- Nom fool is fact-Nom John-Acc sad-made-past
The fact that (he) himself is a fool saddened John.*

49. Jibun - ga baka na koto-ga John-o kanasima-se-ta.

Jibun_i - no shashin - ga otoko_i -o warawa - se - ta.

*Self- Gen photograph-Nom man- Acc laugh-Passive-Past
Pictures of himself amused the man. (made the man laugh)*

50. Jibun - no shashin - ga otoko -o warawa - se - ta.

'Jibun_i - ni kansuru hon - ga Mari_i - no mune - o ut - ta.'

*Self- Dat @@@ book-Nom Mary-Gen heart-Acc hit-Past
That book about herself struck Mary as embarrassing. (hit heart)*

51. Jibun - ni kansuru hon - ga Maty - no mune - o ut - ta.

Mary_i - ga jibun_{i/j} - o aisite inai koto - ga John_j - o gakkari-sase-ta.'

Mary-Nom self-Acc loving is not fact-Nom John-Acc distressed-made-past.

The fact that Mary did not love herself distressed John.

52. Mary - ga jibun - o aisite inai koto - ga John - o gakkari-sase-ta.

= Mary - ga Mary - o aisite inai koto - ga John - o gakkari-sase-ta.

'John_i - ga watashi_j - no jibun_{i/j} - ni kansuru hanashi - o kiniit - ta.'

John-Nom I - Gen self -Dat about stories-Acc likes

John likes my stories about himself.

53. John - ga watashi - no jibun - ni kansuru hanashi - o kiniit - ta.

= John - ga watashi - no John - ni kansuru hanashi - o kiniit - ta.

*'John - to Paul_j -wa tomodachi da. John_i - ga jibun_{i/*j} - ga tensai-da to omotte-iru.'*

John and Paul-Top friends COP. John-NOM himself-NOM genius-COP COMP think-PRES

John and Paul are friends. John thinks Paul is a genius.

54. John - to Paul -wa tomodachi da. John - ga jibun - ga tensai-da to omotte-iru.

= John - ga Paul - ga tensai-da to omotte-iru.

'Mary_i - ga kanozyo_{ij} - ga tensai-da to omotte-iru.'

Mary-Nom she- Nom genius-COP COMP think-Present

Mary thinks that Mary's mother is a genius.

55. Mary - ga kanozyo - ga tensai-da to omotte-iru.

= Mary - ga Mary - no okaasan - ga tensai-da to omotte-iru

'Jibun_i - ni kansuru hon - ga Mari_i - no atami - ni ochi-ta.'

Herself-Dat book-Nom Mary- Gen head-Dat fell- Past

That book about herself struck Mary on the head. (fell)

56. Jibun - ni kansuru hon - ga Mary - no atami - ni ochi - ta.

'John_i - wa Mary_j - ga jibun_{ij} - o aisite iru koto - o sitte ita.'

John- Top Mary-Nom self- Acc loving is fact-Acc knowing was

John knew that Mary loves herself.

57. John - wa Mary - ga jibun - o aisite iru koto - o sitte ita.

= John - wa Mary - ga Mary - o aisite iru koto - o sitte ita.

'John_i - ga watashi_j - no jibun_{ij} - ni kansuru hanashi - o kiniit - ta.'

John-Nom I - Gen self -Dat about stories-Acc likes

John likes my stories about myself.

58. John - ga watashi - no jibun - ni kansuru hanashi - o kiniit - ta.

= John - ga watashi - no watashi - ni kansuru hanashi - o kiniit -

ta.

'Mary_i - ga jibun_{i/j} - o aisite inai koto - ga John_j - o gakkari-sase-ta.'

Mary-Nom self-Acc loving is not fact-Nom John-Acc distressed-made-past.

The fact that Mary did not love himself distressed John.

59. Mary - ga jibun - o aisite inai koto - ga John - o gakkari-sase-ta.

= Mary - ga John - o aisite inai koto - ga John - o gakkari-sase-ta.

'John - ga tensai-da to omotte-iru.'

John-Nom 'pro' genius-COP COMP think-PRES

John thinks (he) is a genius.

60. John - ga tensai-da to omotte-iru.



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ID Number

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Level

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SCREENING QUESTIONNAIRE (Japanese)

Romaji-de kaite kudasai

Namae

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Myooji

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Hizuke

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Nenrei

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Seibetsu

☐ Dansei ☐ Josei

12 sai yori mae ni nihongo igai no kotoba o hanashimashita ka?

☐ Iie ☐ Hai

Nanigo o hamashima shita ka

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Doko-de sodachi mashita ka

Kuni

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Chiiki/Toshi

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Anata-no okaasan-wa dokode sodachimashitaka

Kuni

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Chiiki/Toshi

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Anata-no otoosan-wa doko-de sodachimashita ka

Kuni

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Chiiki/Toshi

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Nihongo-no terebi o mimasuka?

☐ Hai ☐ Iie



ID Number	Level

SCREENING QUESTIONNAIRE

The purpose of this questionnaire is to establish the linguistic background of individuals taking part in linguistic tests carried out as part of a DPhil thesis.

All the personal data supplied will be treated in the strictest confidentiality.

Please answer all the questions. If unsure of the exact answer please give the best approximation.

First Name

Surname

Date

Age

Sex

☐ Male

☒ Female

Age you first came in contact with the language?

English

Japanese

Other/specify

Age you first used the language actively (in years)

English

Japanese

Other/specify

Where did you first come in contact with

☒ Home ☐ School ☐ Social	☐ Home ☐ School ☐ Social	☐ Home ☐ School ☐ Social
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Where did you first use the language actively

☒ Home	☒ Home	☐ Home
English (tick one only) ☐ School	Japanese (tick one only) ☐ School	Other (tick one only) ☐ School
☐ Social	☐ Social	☐ Social

Where did you grow up?

Country	Region/Town

Where did your mother grow up?

Country	Region/Town

Where did your father grow up?

Country	Region/Town

Do you watch Japanese TV?

☒ Yes ☐ No

Percentage use in the past 2 years (estimate percentage use of English and Japanese in different areas of your life in the past 2 years, e.g. if you used Japanese at school 60% of the time, English 40% of the time, write 60 against Japanese and 40 against English)

	Japanese	English
Home		60
Work		
Study		
Social		
Leisure		



Current percentage use (estimate percentage use of English and Japanese in different areas of your current life, e.g. if you used Japanese at school 60% of the time, English 40% of the time, write 60 against Japanese and 40 against English)

	Japanese	English
Home		7
Work	6 0	4 0
Study	7 0	3 0
Social		
Leisure	5	5 0

Language mastery (if in your own estimate you master both languages to the same extent tick **both**, otherwise tick the language you have more mastery in)

☒ Both

☐ Japanese

☐ English

Identification Number

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| 1 | (1) | (2) | (3) | (4) | (5) | (6) |
| 2 | (1) | (2) | (3) | (4) | (5) | (6) |
| 3 | (1) | (2) | (3) | (4) | (5) | (6) |
| 4 | (1) | (2) | (3) | (4) | (5) | (6) |
| 5 | (1) | (2) | (3) | (4) | (5) | (6) |
| 6 | (1) | (2) | (3) | (4) | (5) | (6) |
| 7 | (1) | (2) | (3) | (4) | (5) | (6) |
| 8 | (1) | (2) | (3) | (4) | (5) | (6) |
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| 28 | (1) | (2) | (3) | (4) | (5) | (6) |
| 29 | (1) | (2) | (3) | (4) | (5) | (6) |
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| 31 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 35 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 37 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 38 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 39 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 40 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 41 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 42 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 43 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 44 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 45 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

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| 46 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 47 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 48 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 49 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 50 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 51 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 52 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 53 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 54 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 55 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 56 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 57 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 58 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 59 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 60 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |



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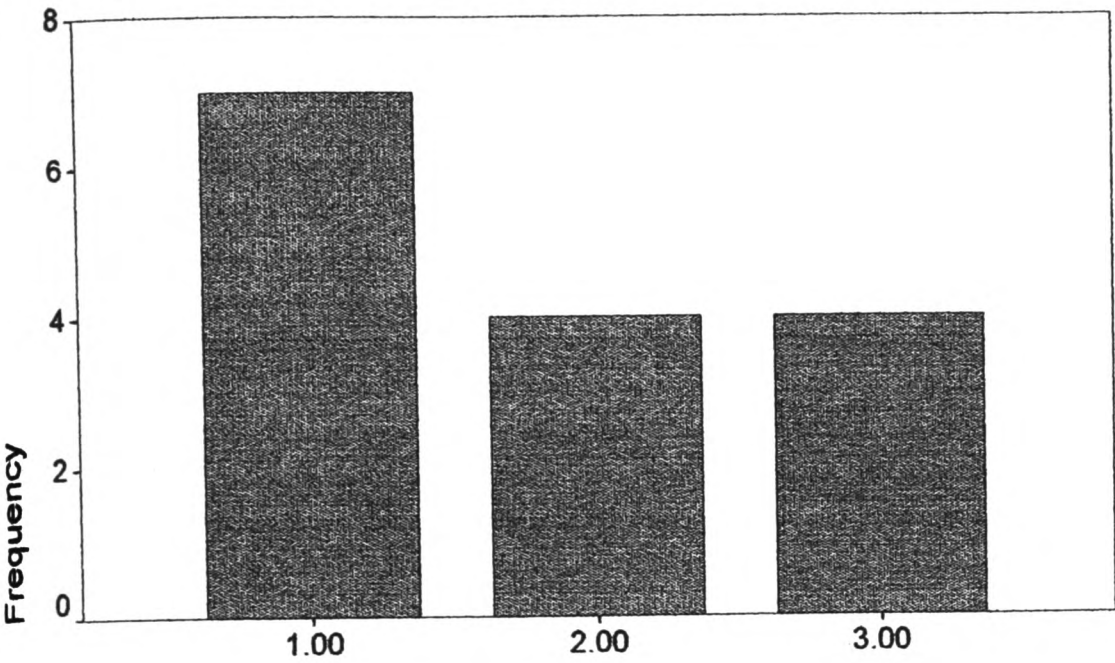
Appendix D – raw data

This appendix contains the raw data for the main experiment (the comparison of bilinguals and monolinguals). It shows the distribution of answers on the 1 to 6 acceptability scale for the Waseda Japanese monolinguals (forward direction), the Delaware Anglophones (forward direction) and the bilinguals who started using their second language by or before the age of 6.

Bar Chart

q1

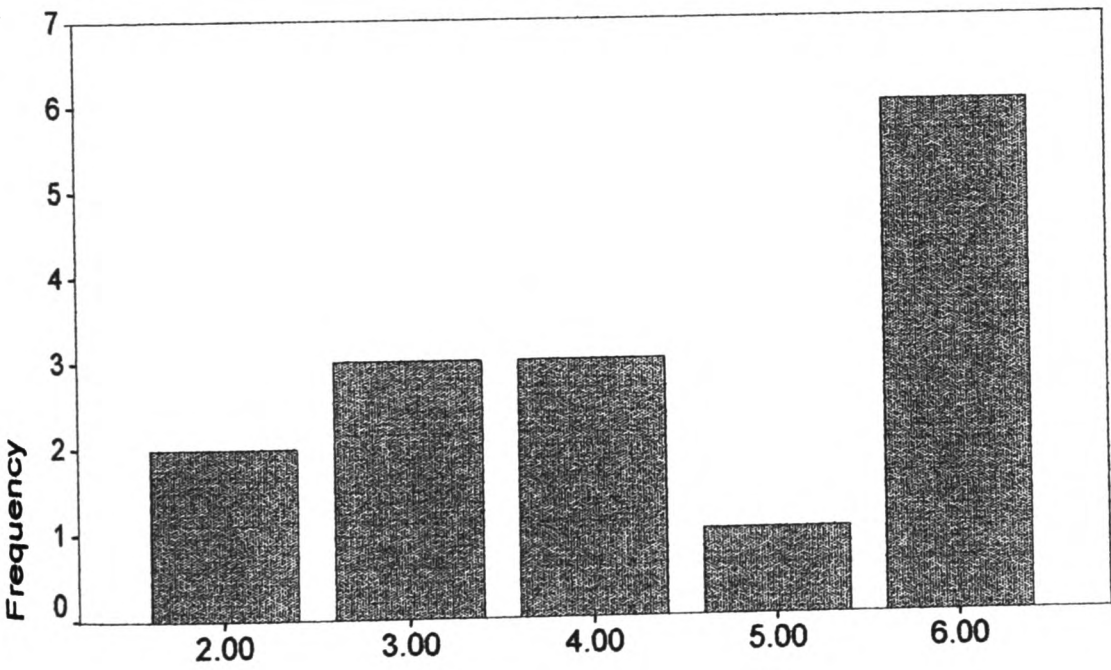
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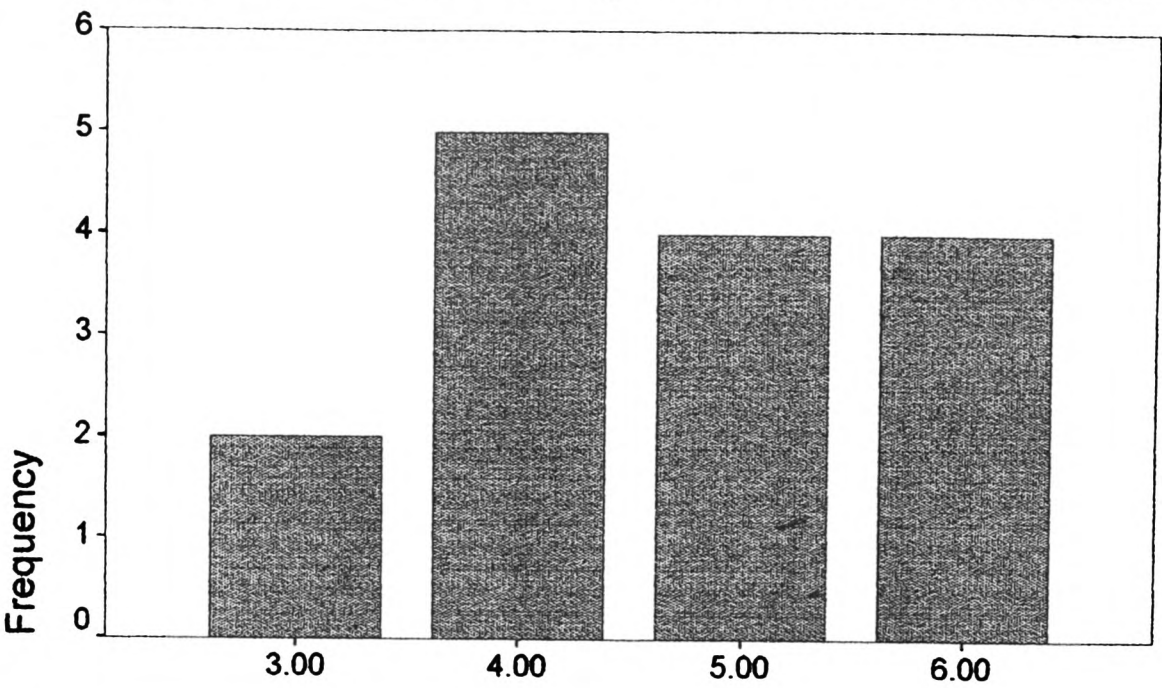
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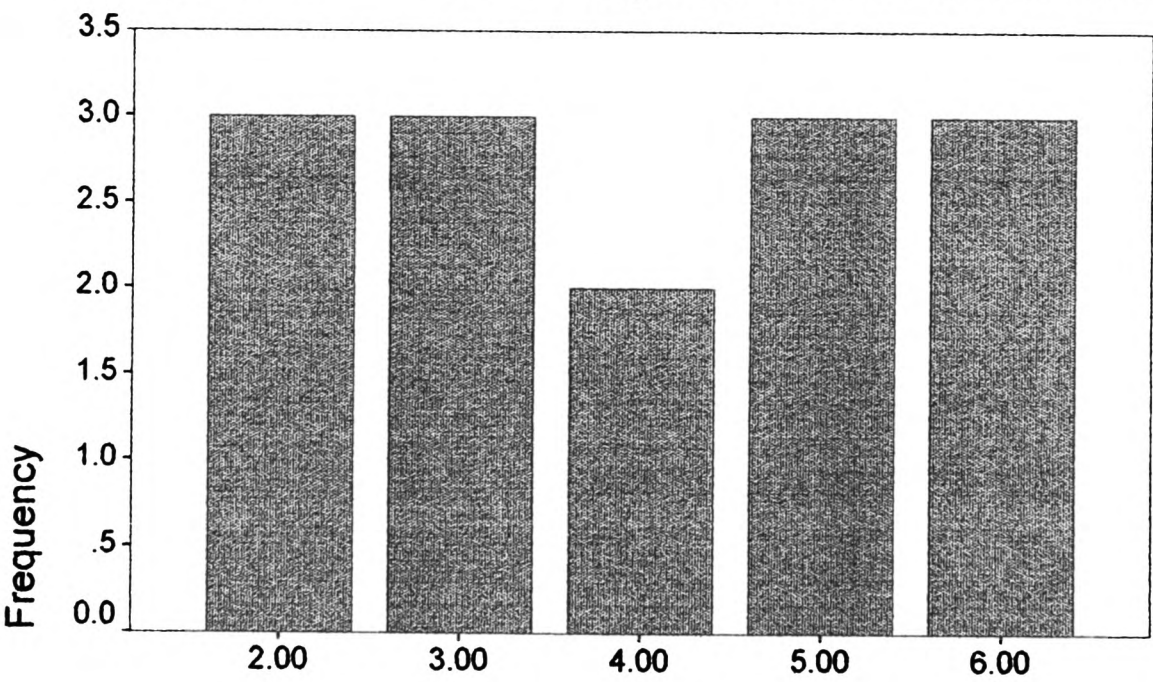
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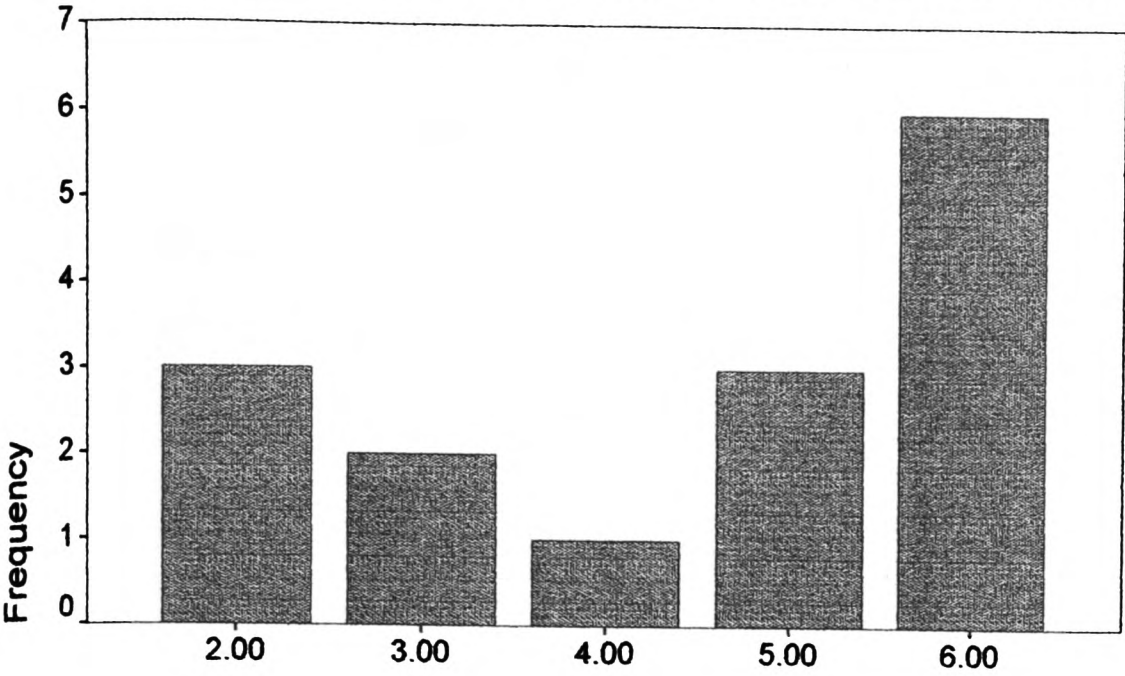
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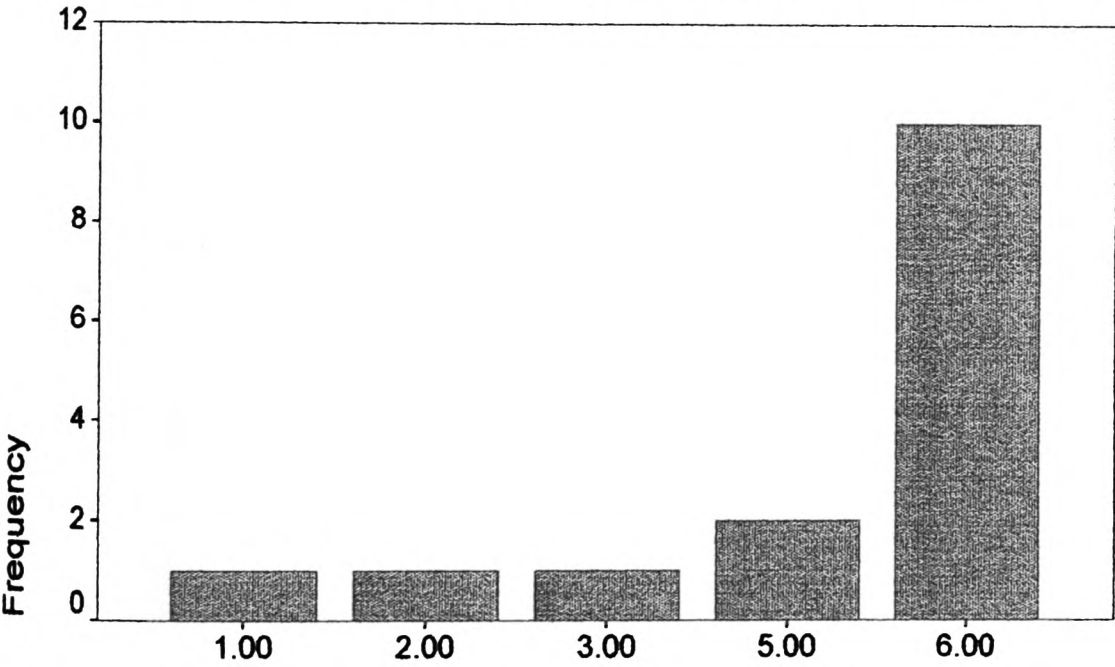
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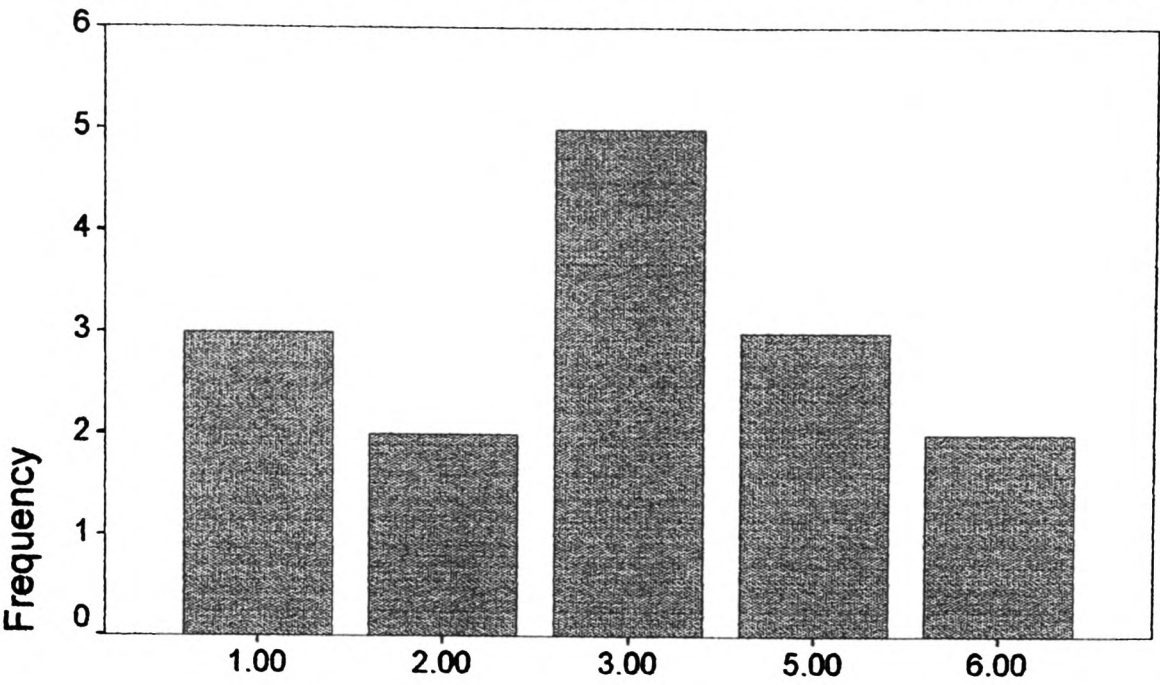
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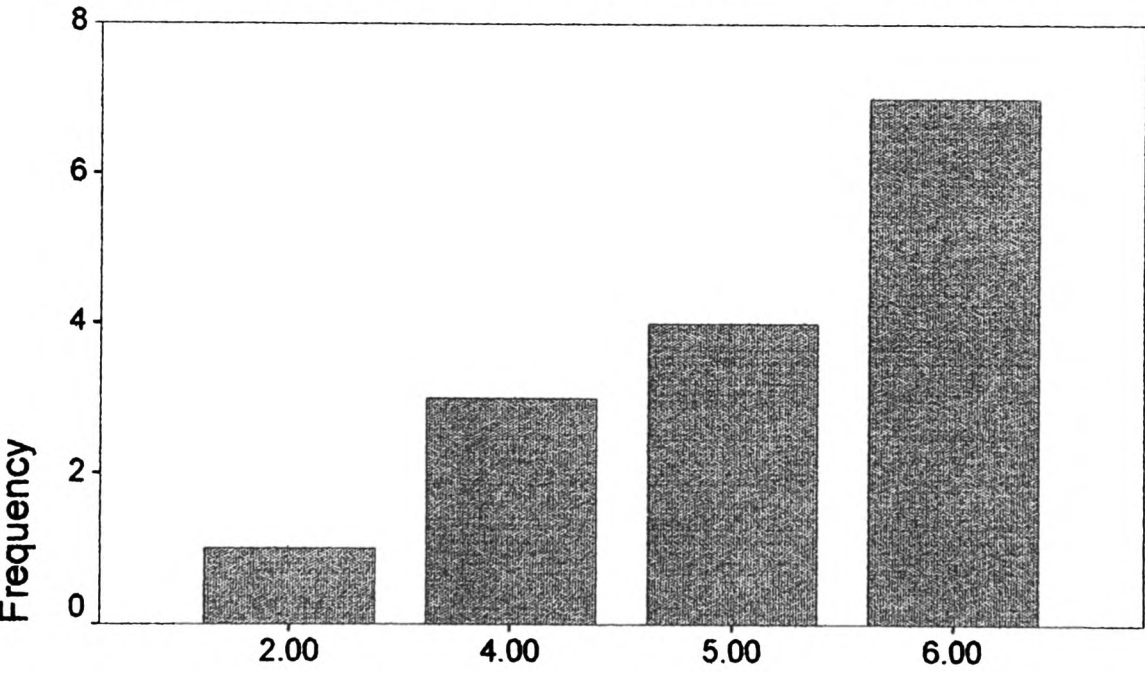
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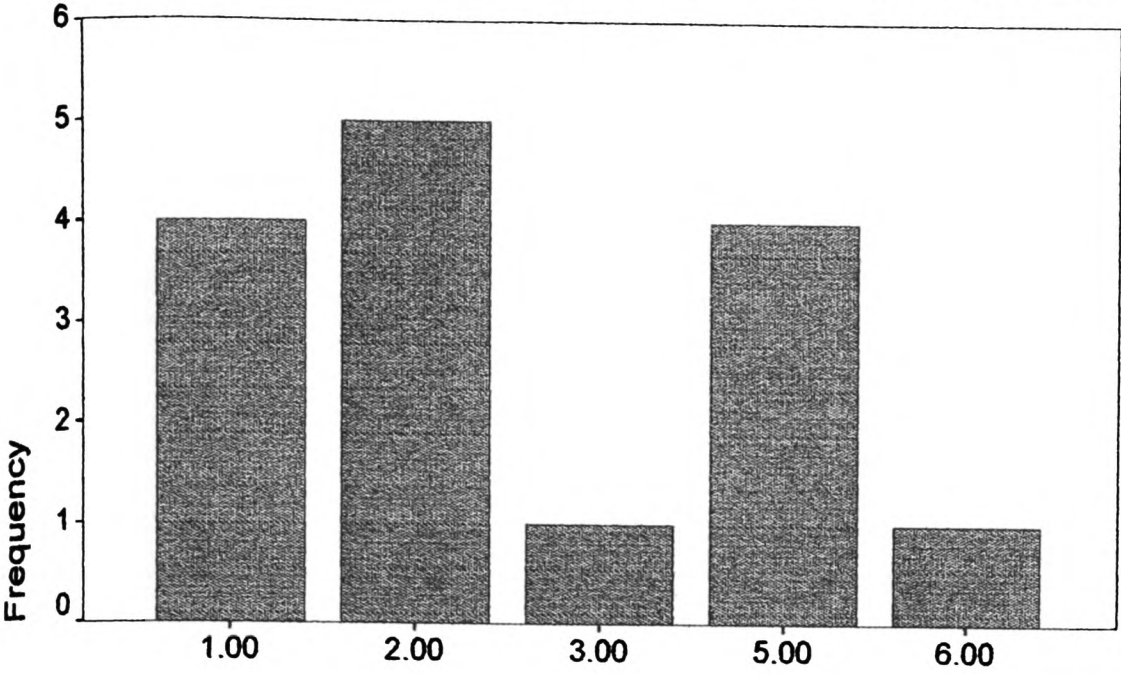
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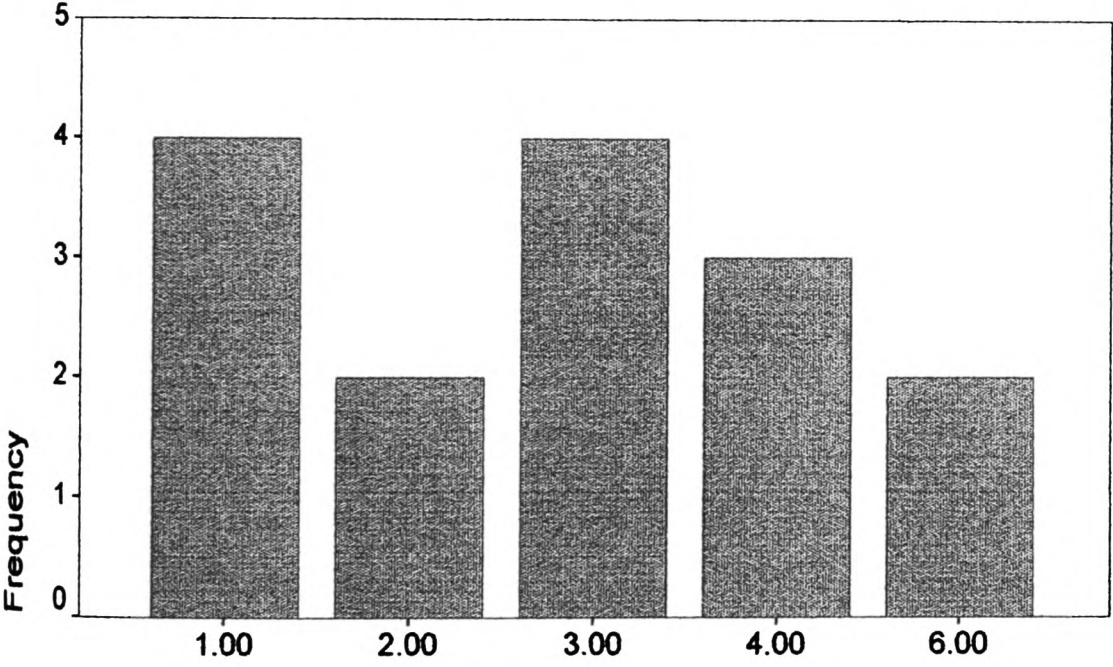
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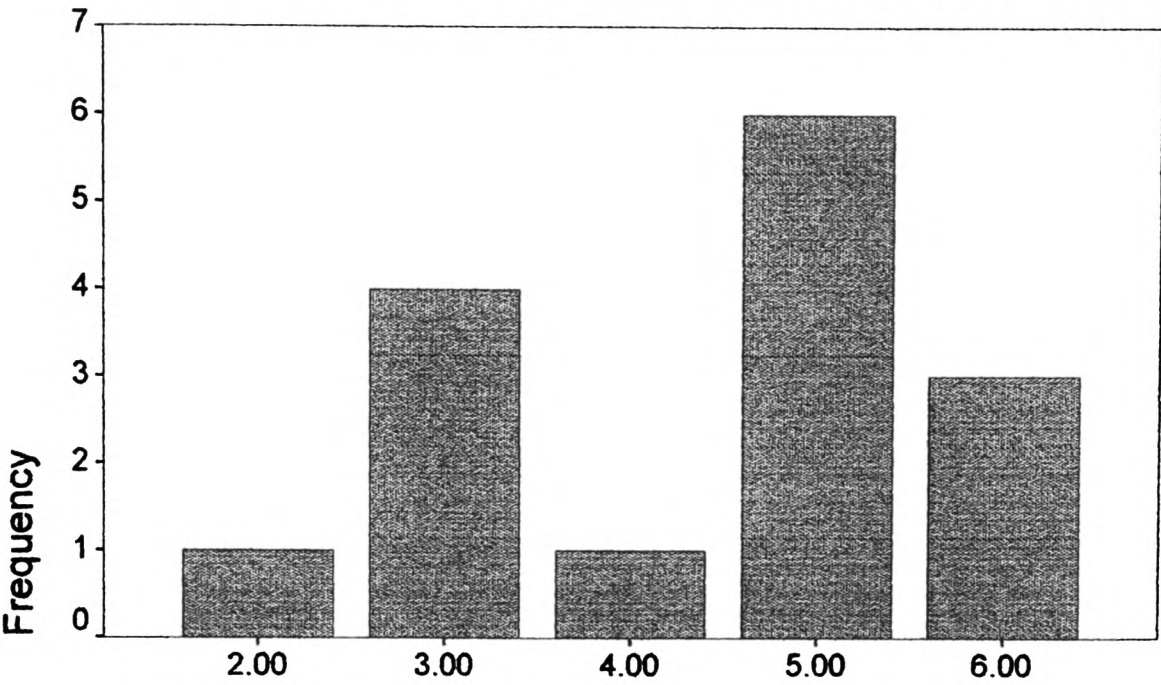
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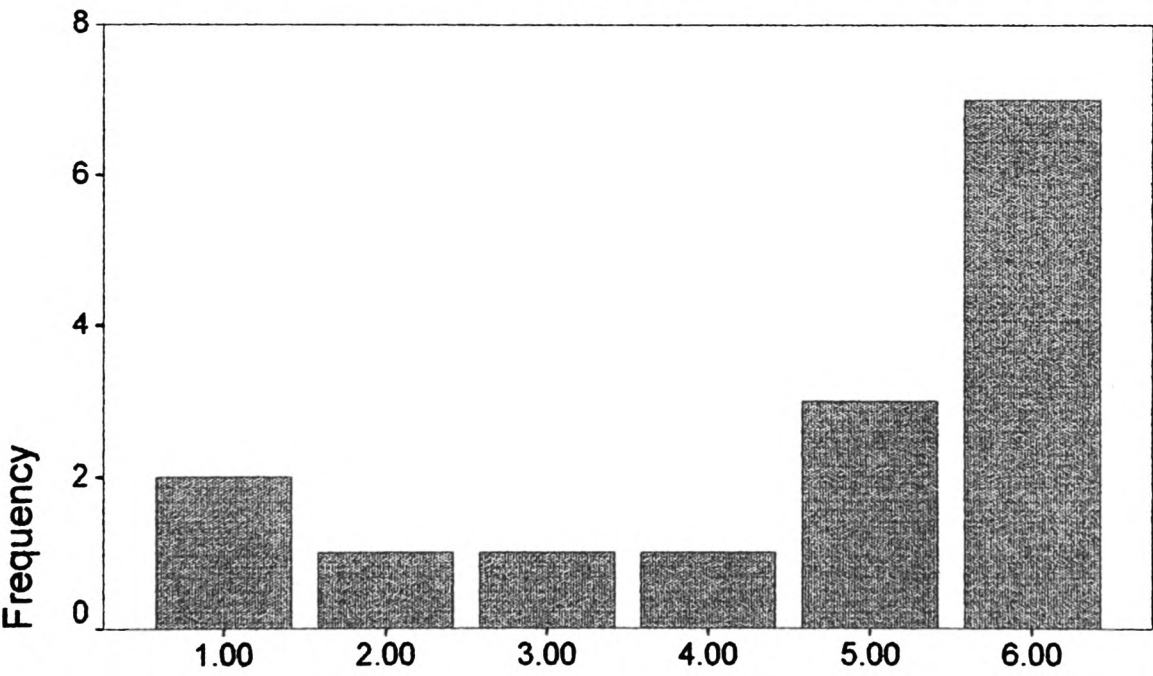
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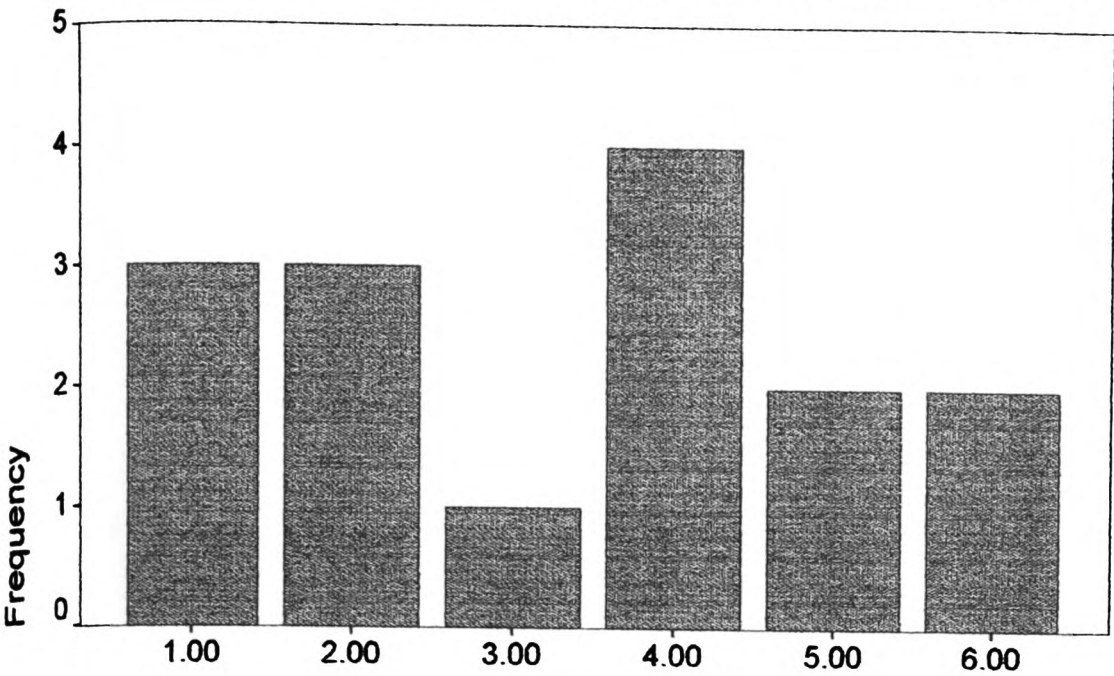
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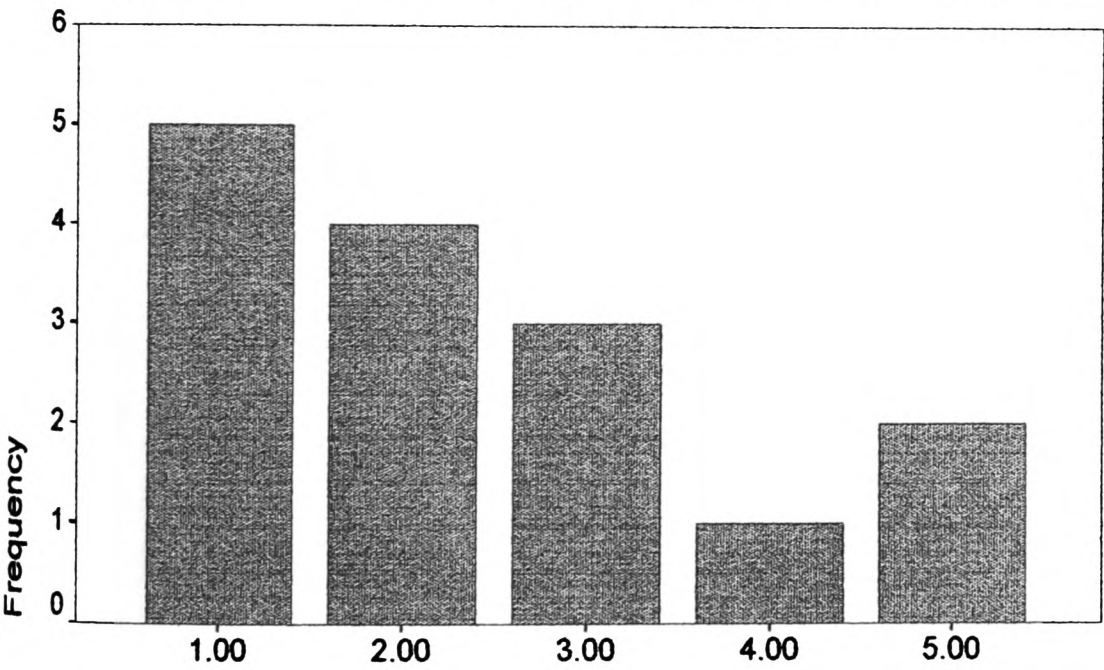
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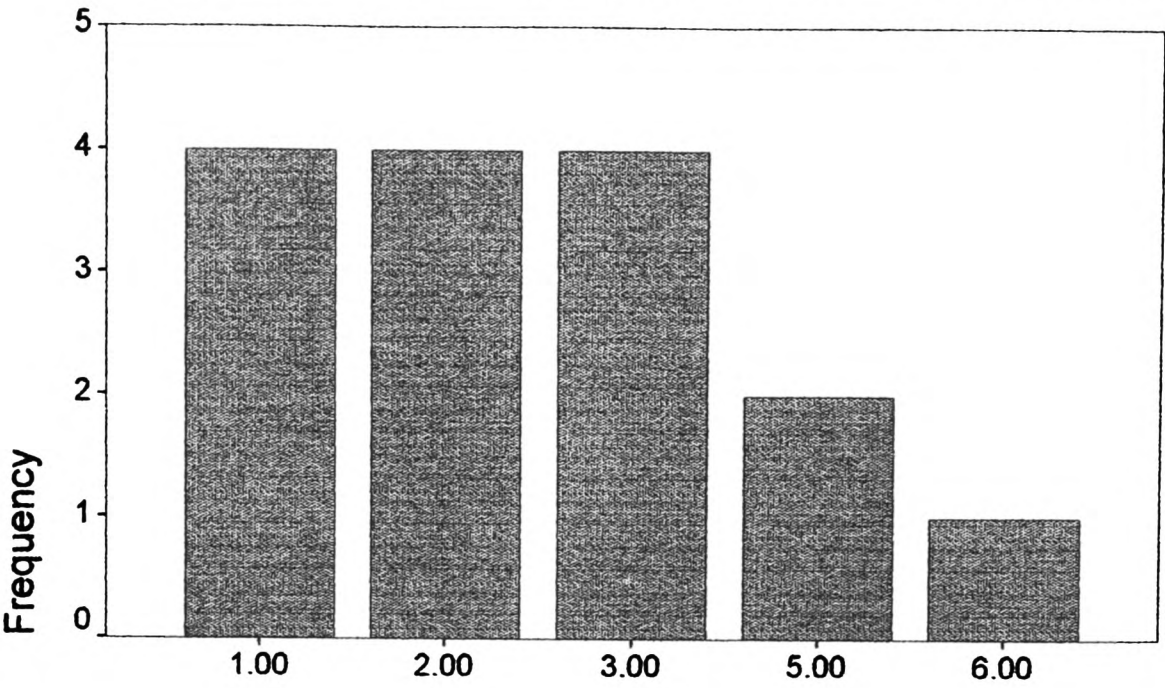
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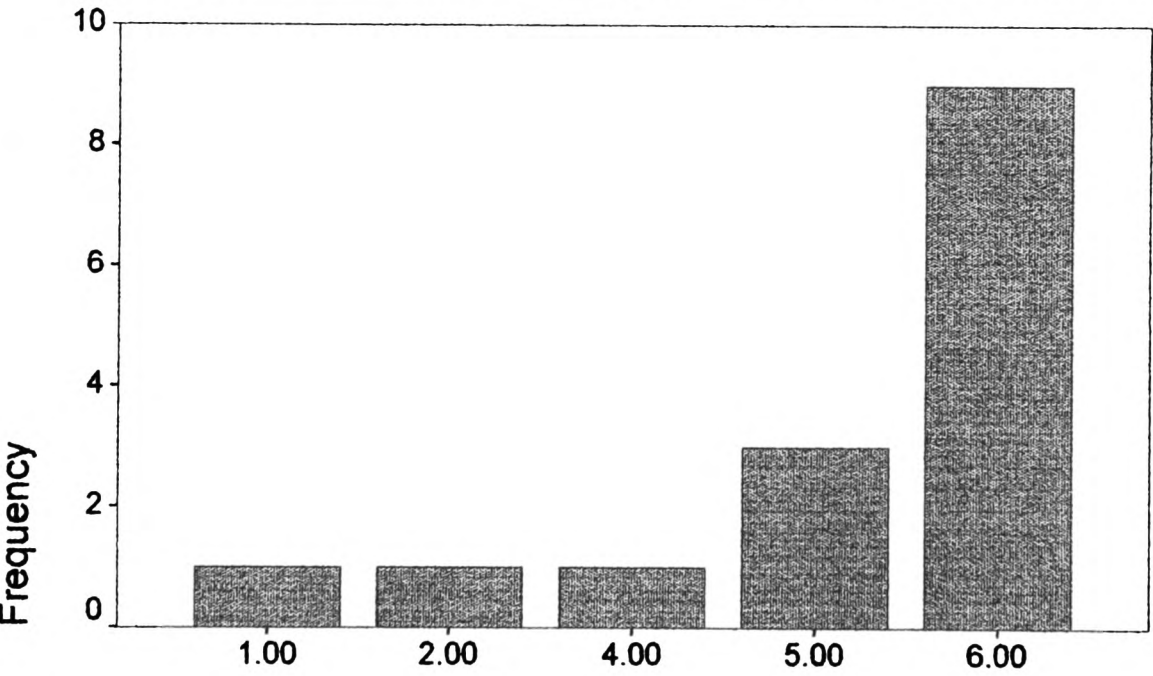
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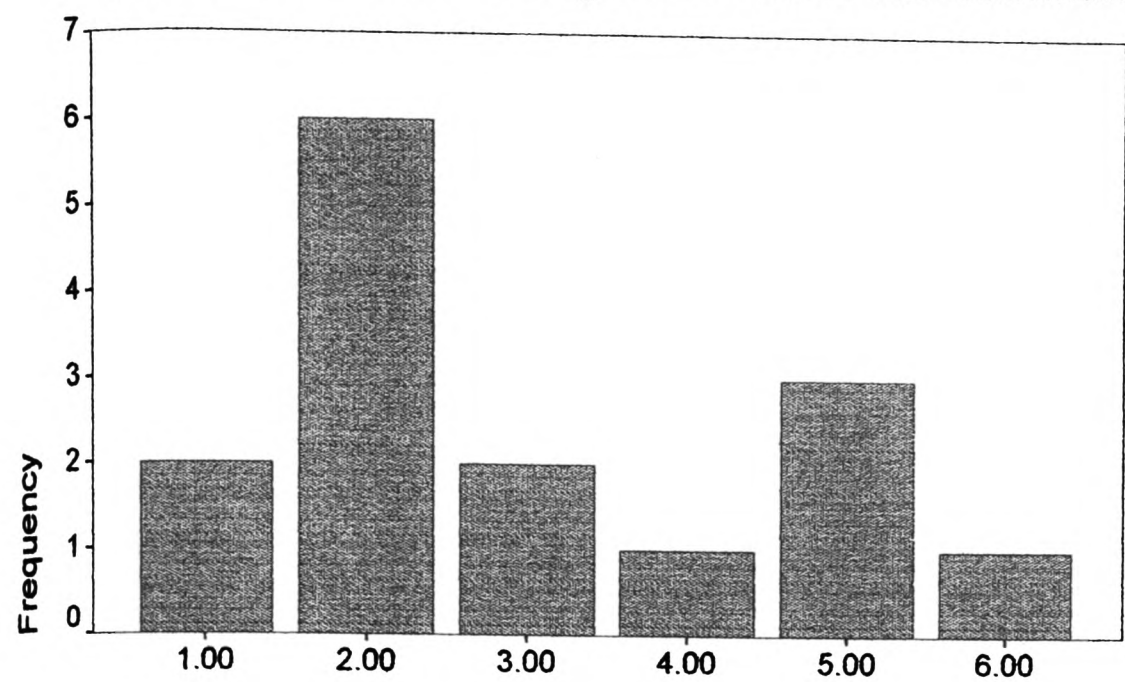
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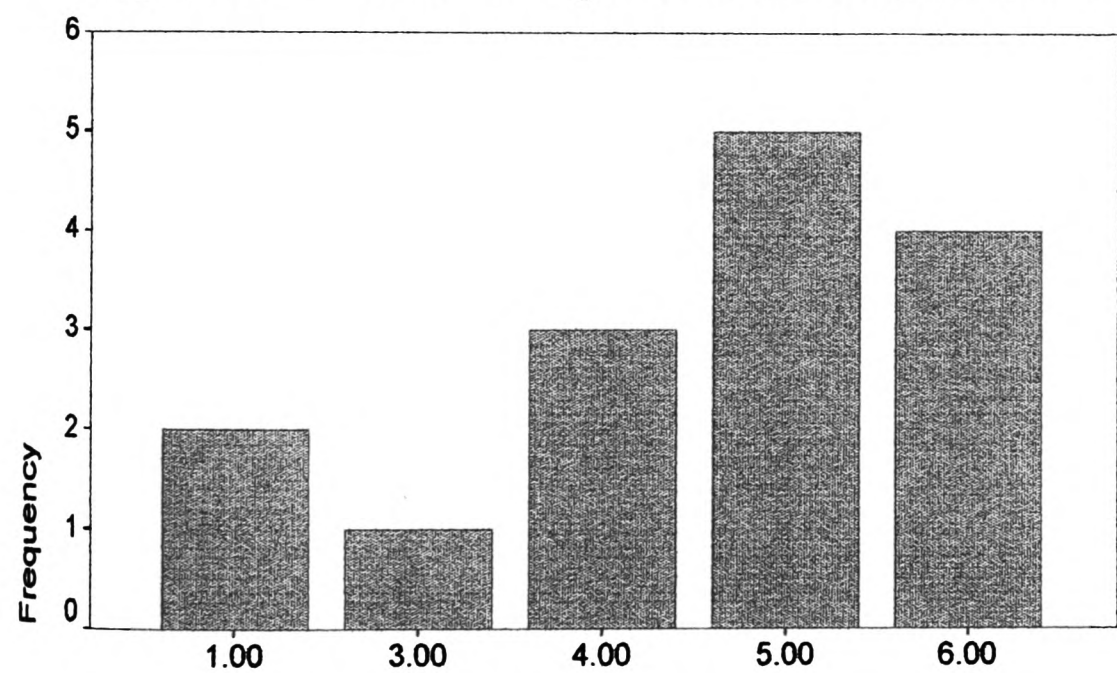
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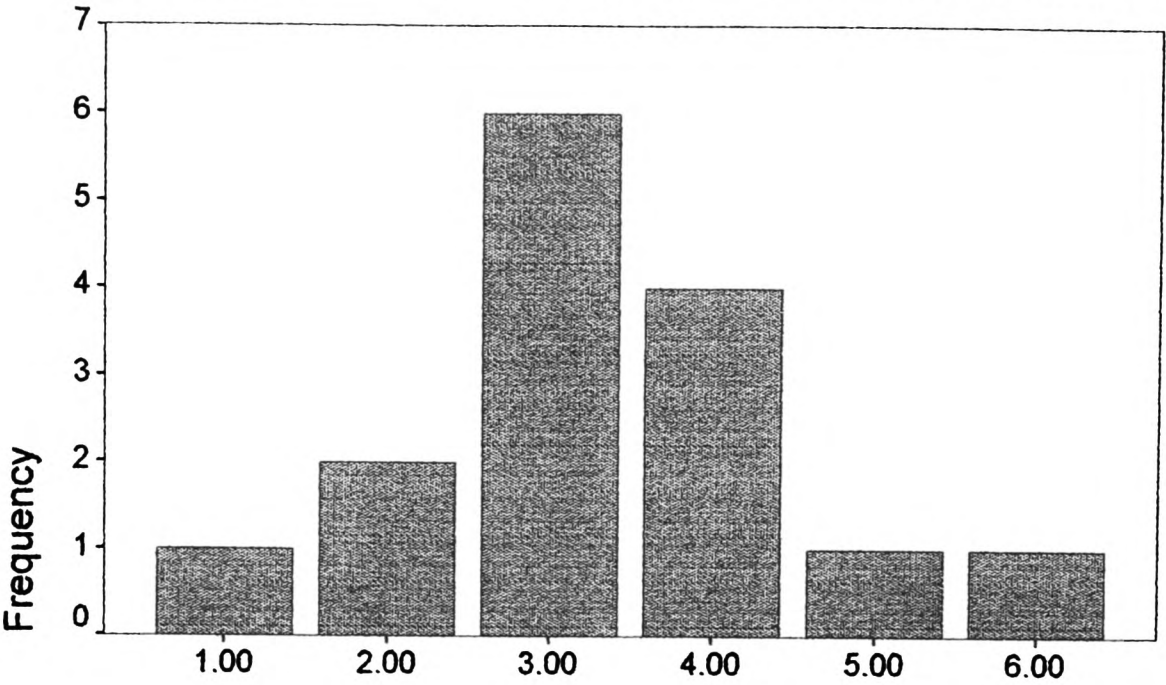
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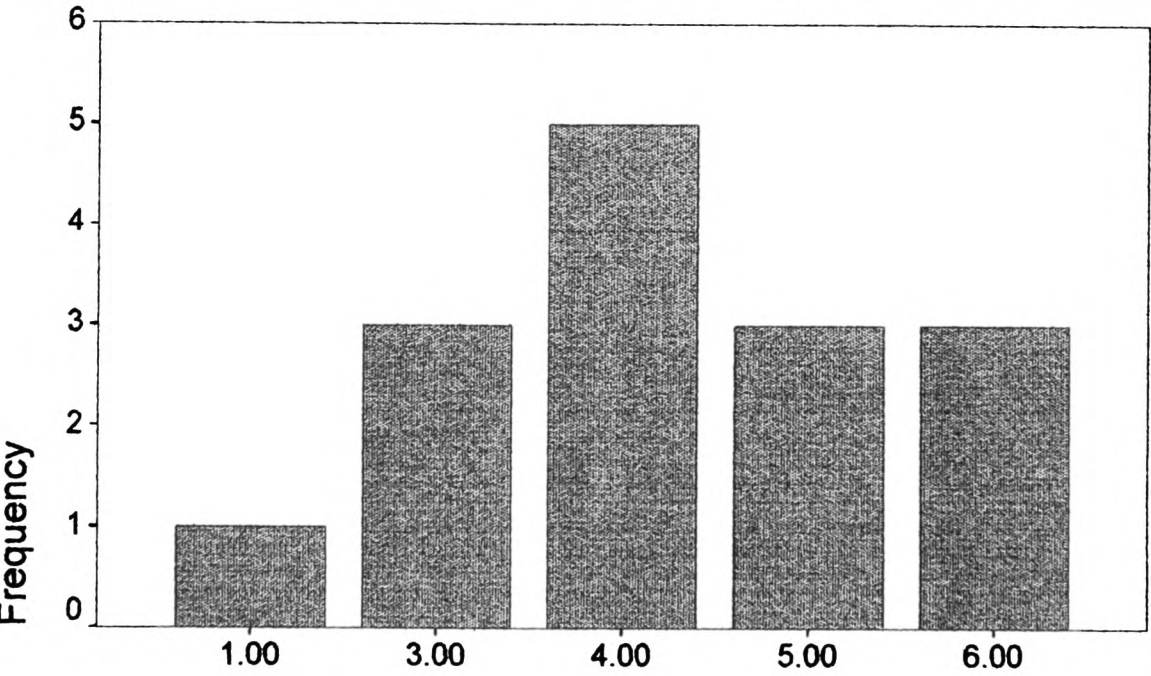
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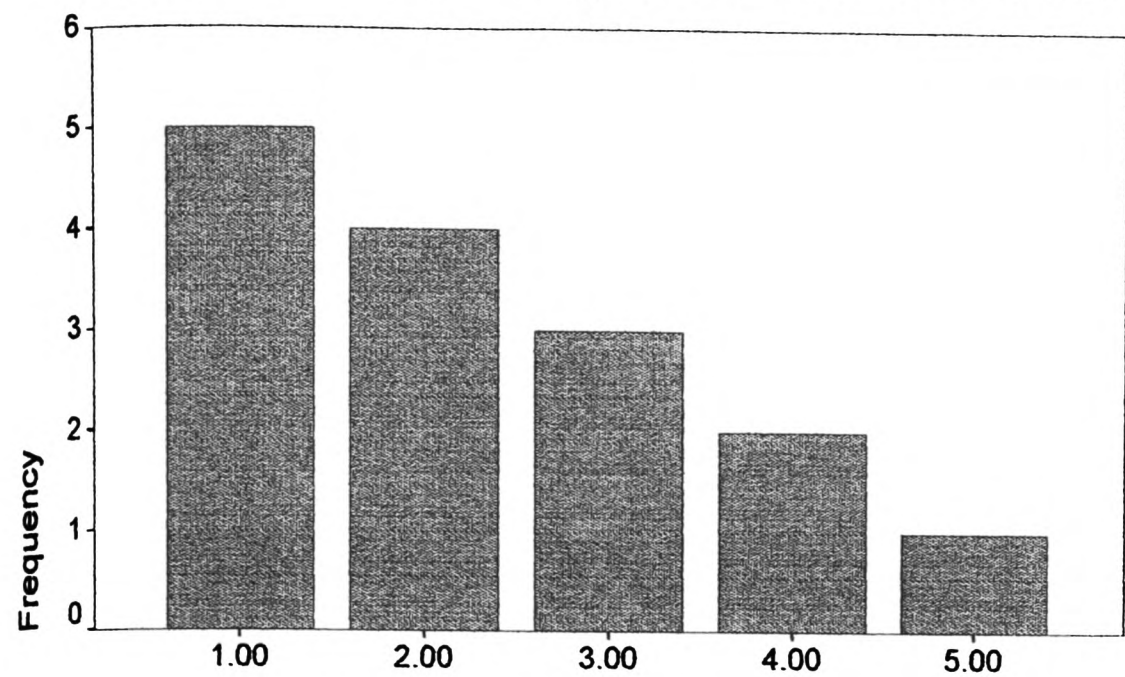
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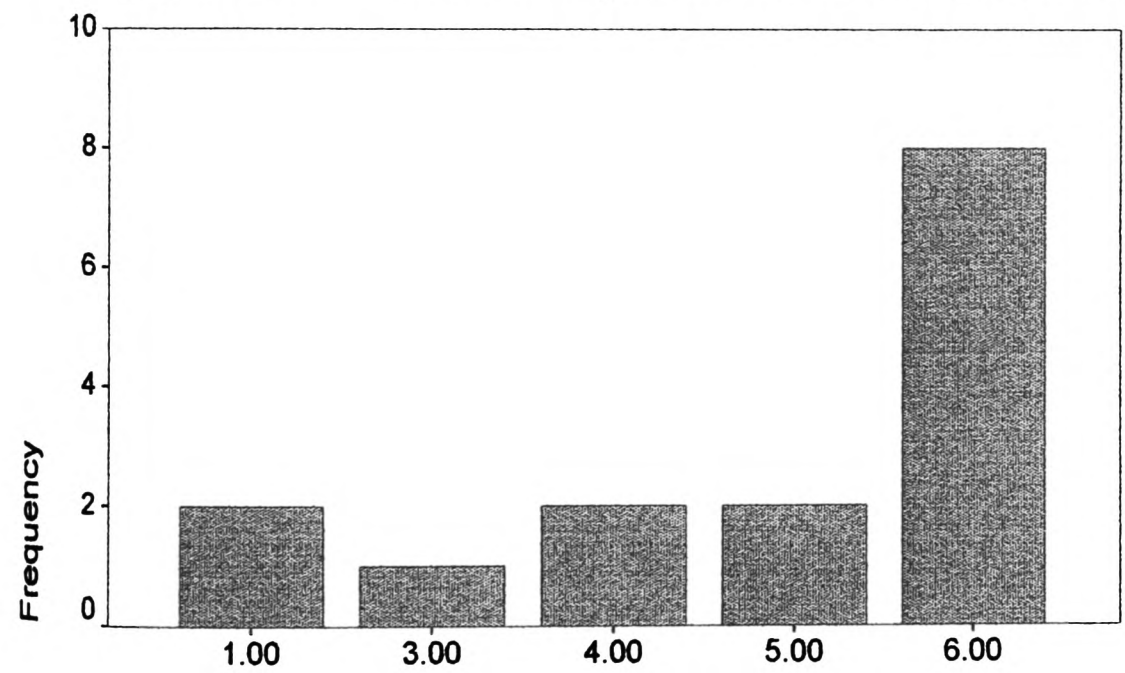
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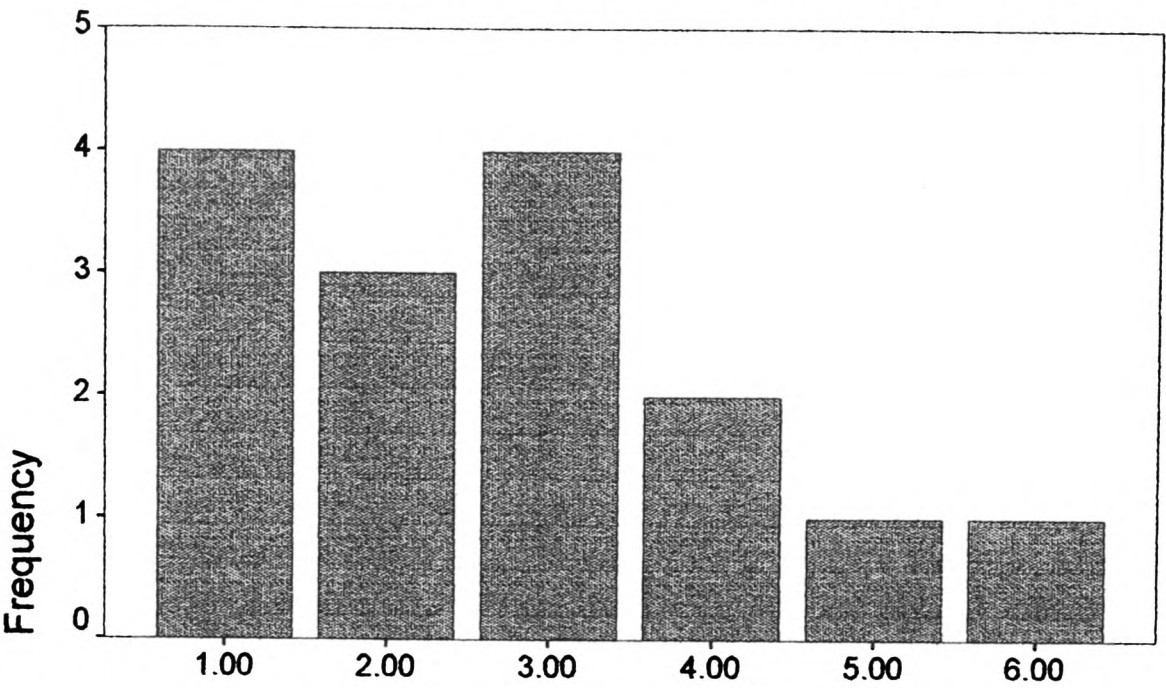
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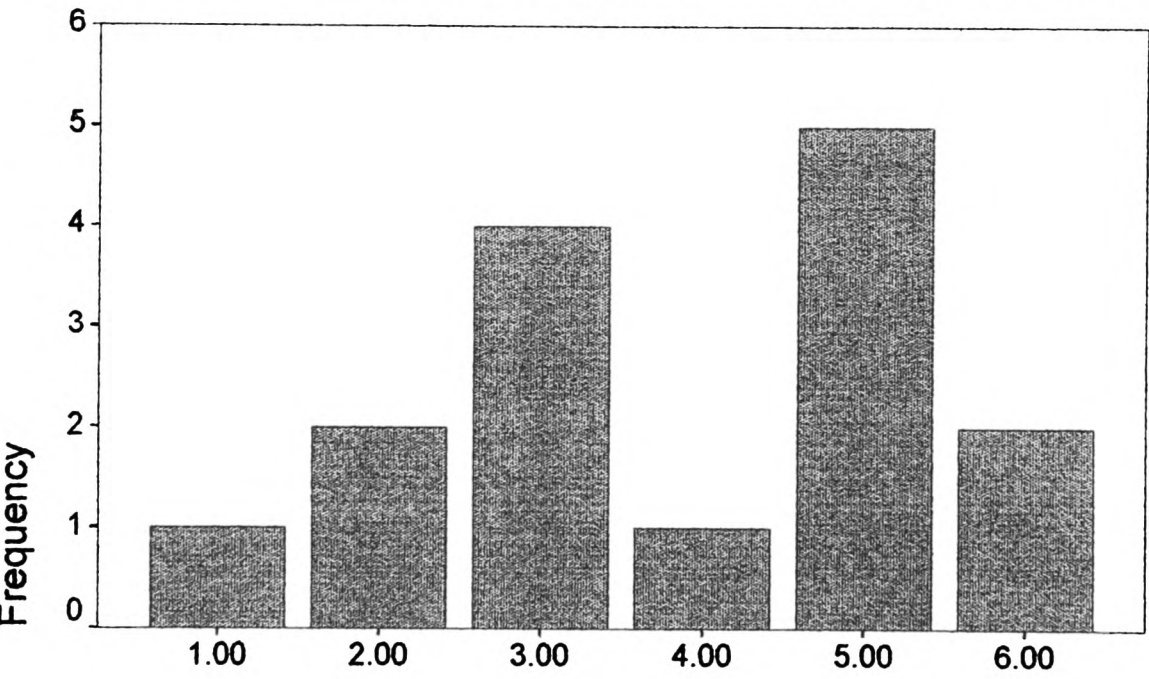
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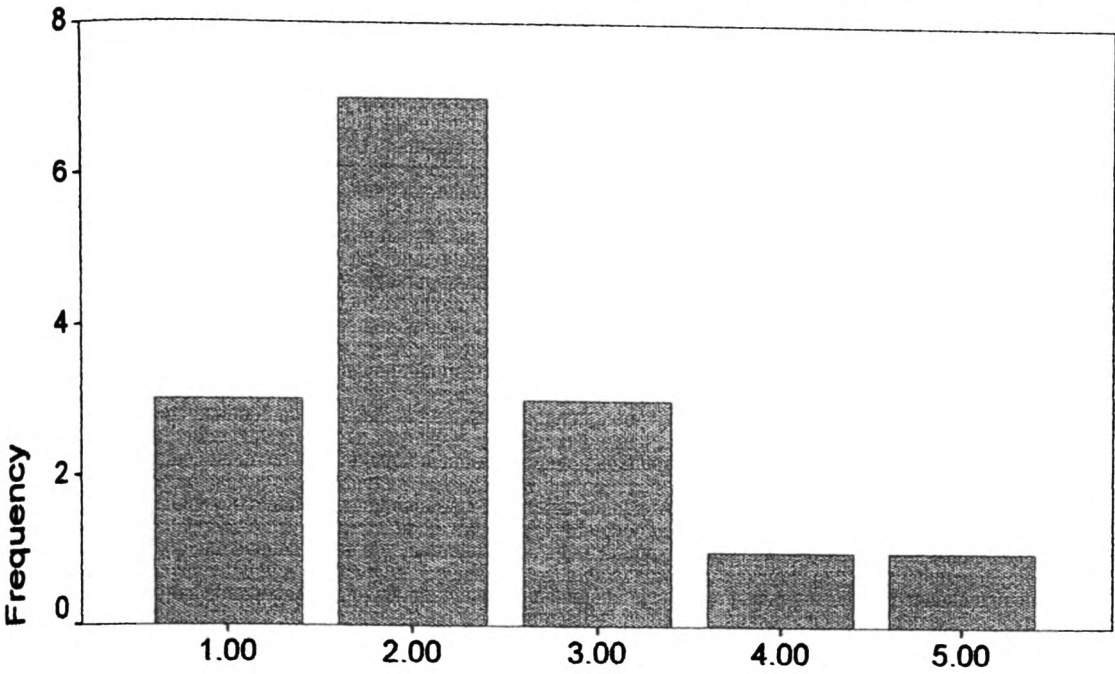
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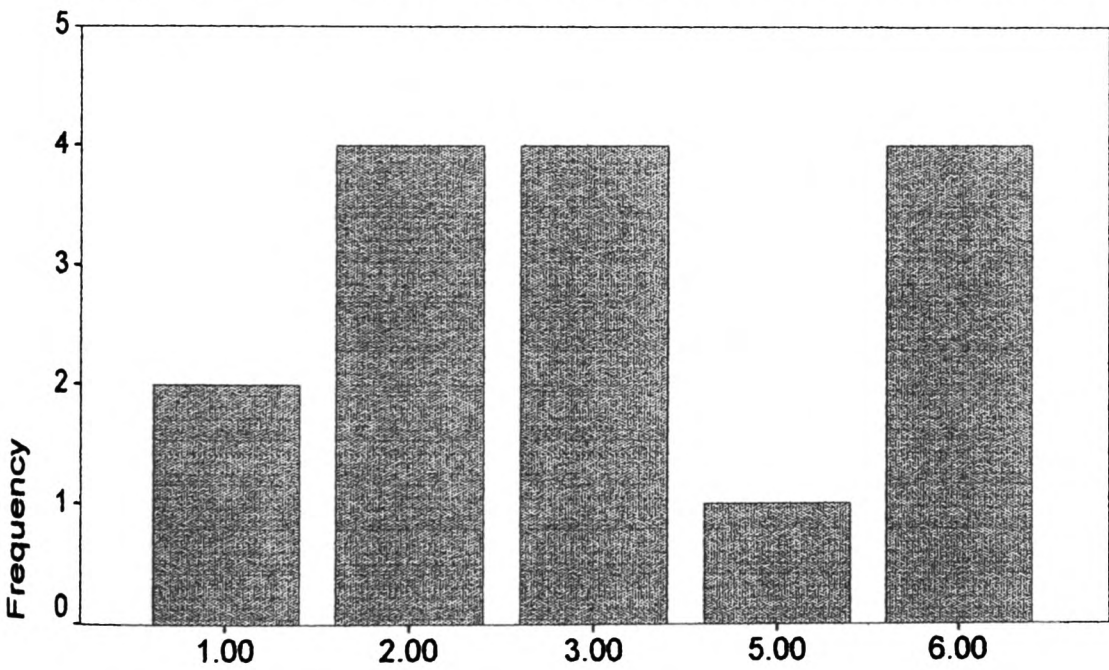
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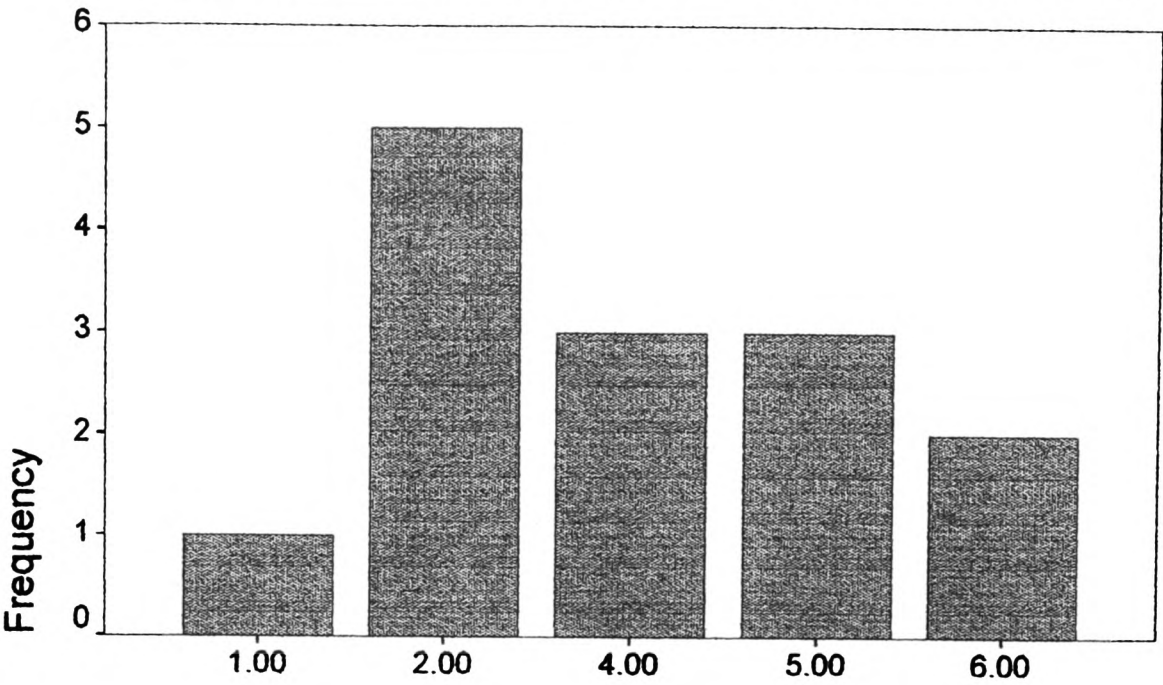
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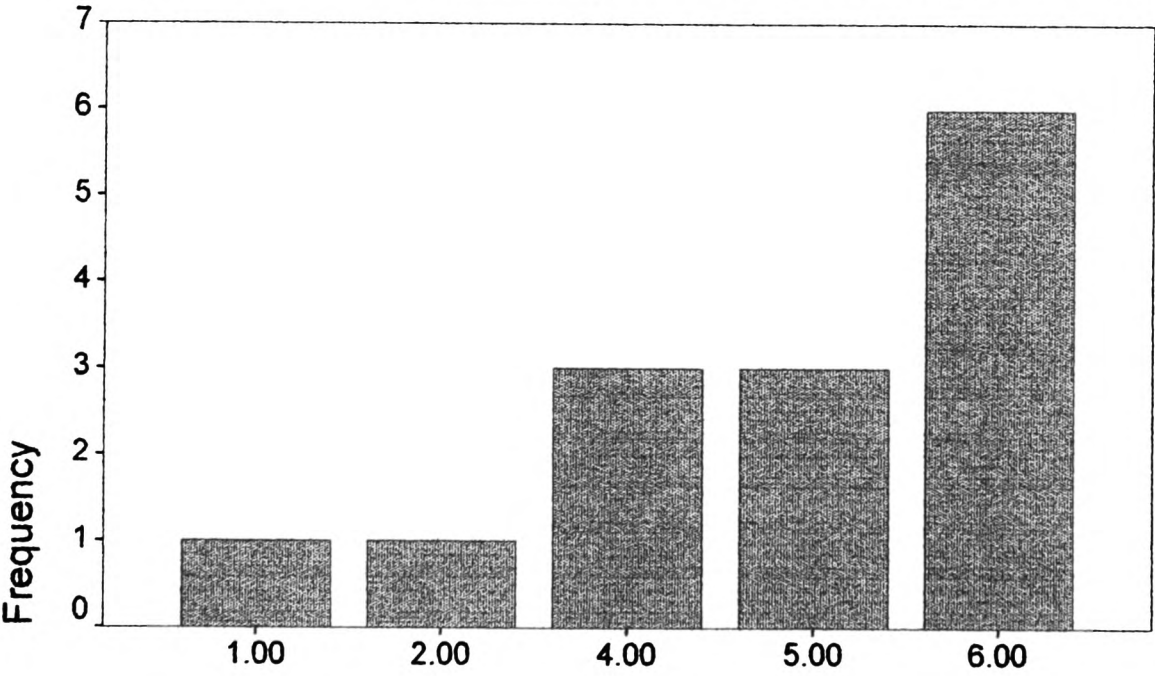
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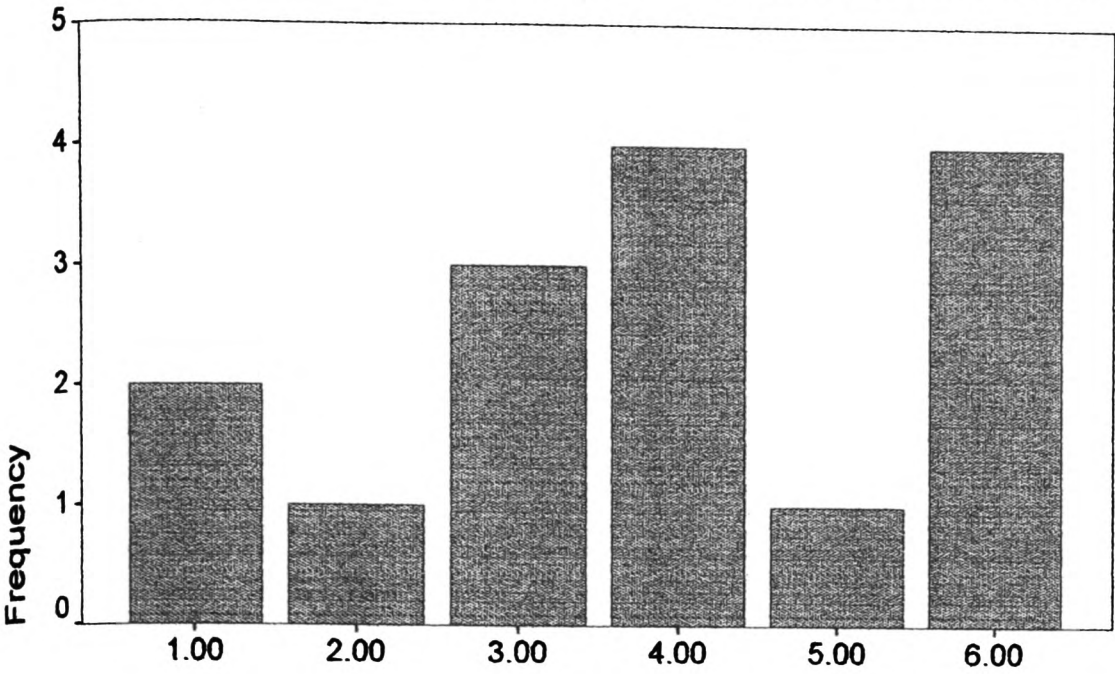
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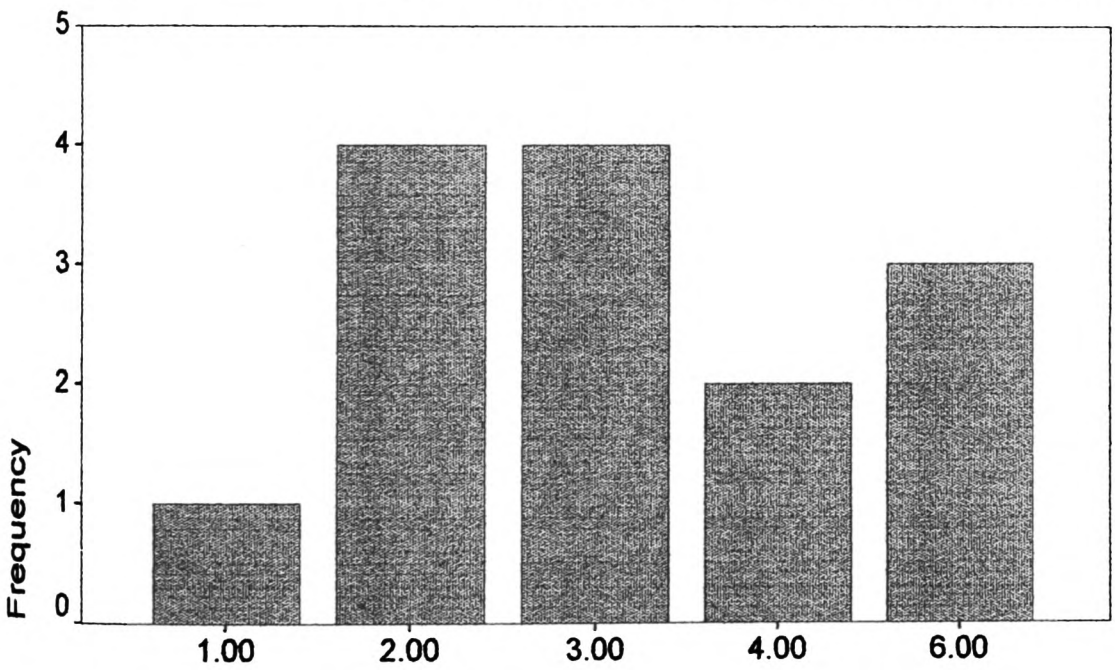
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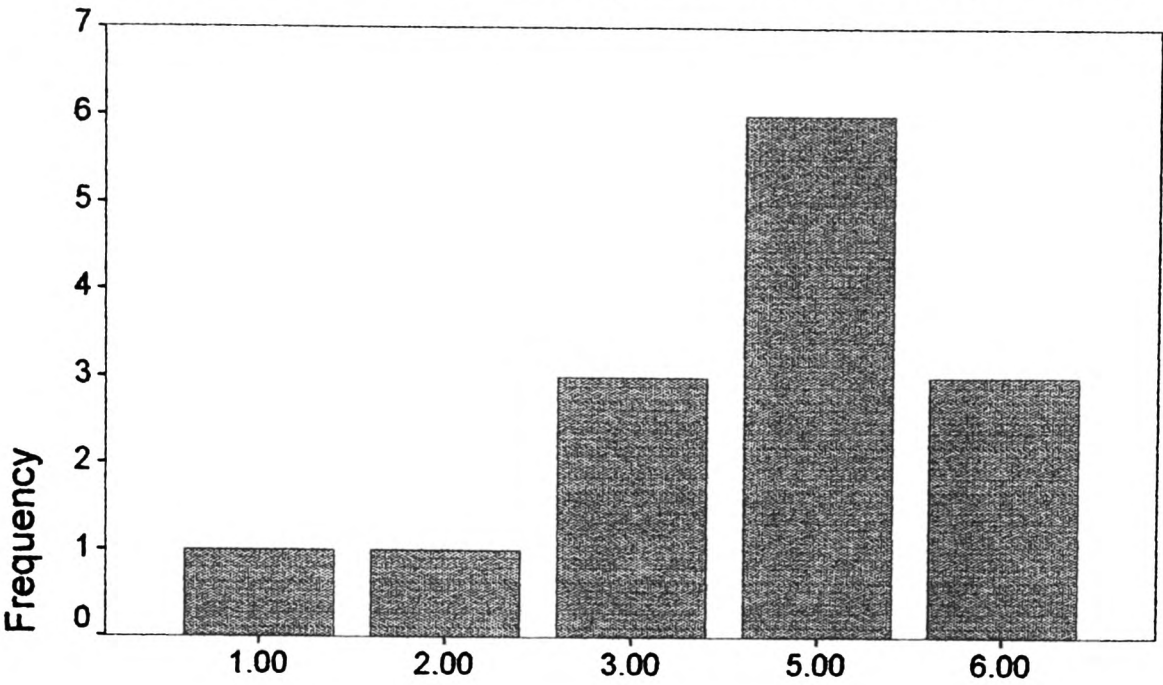
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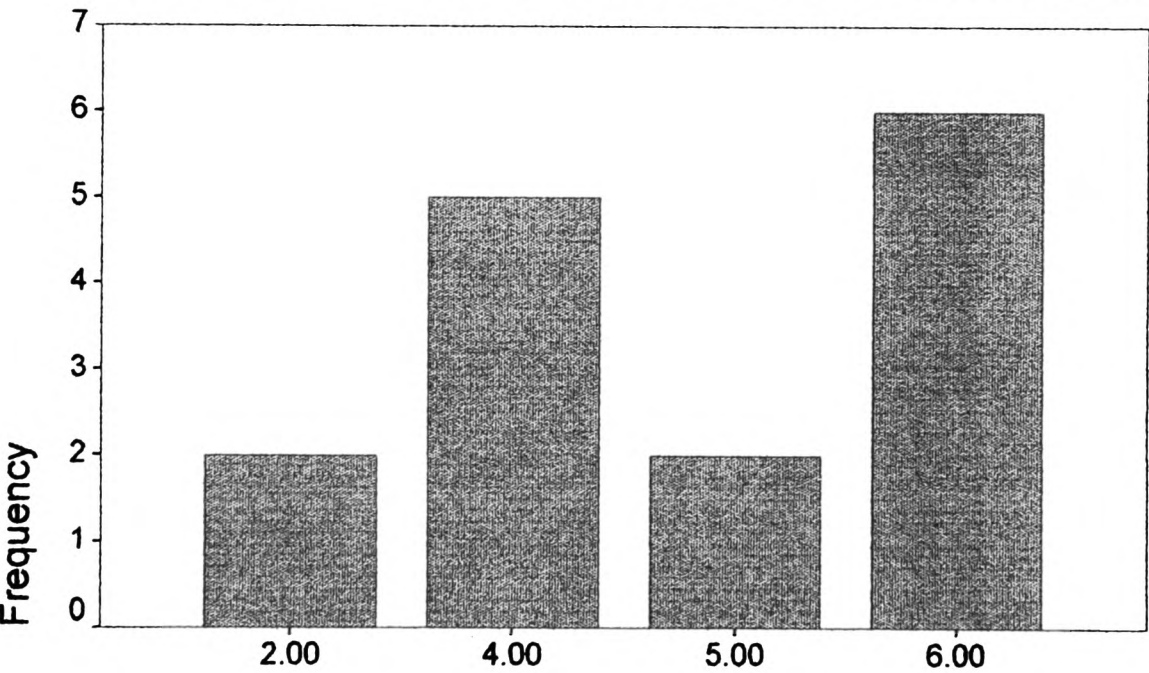
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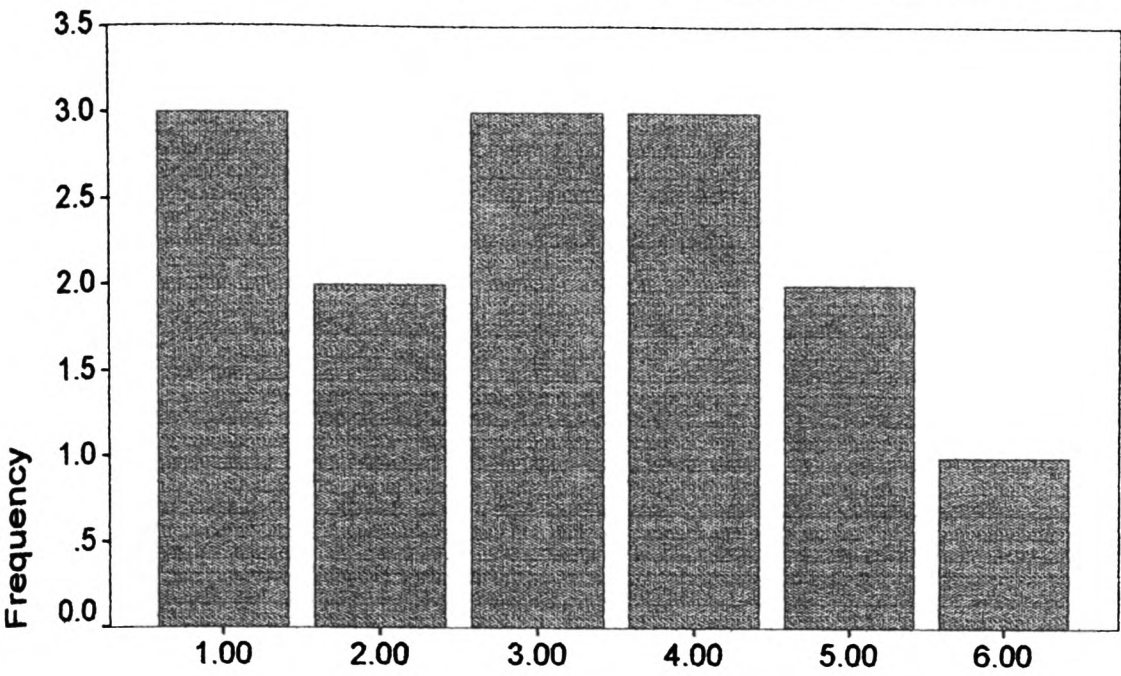
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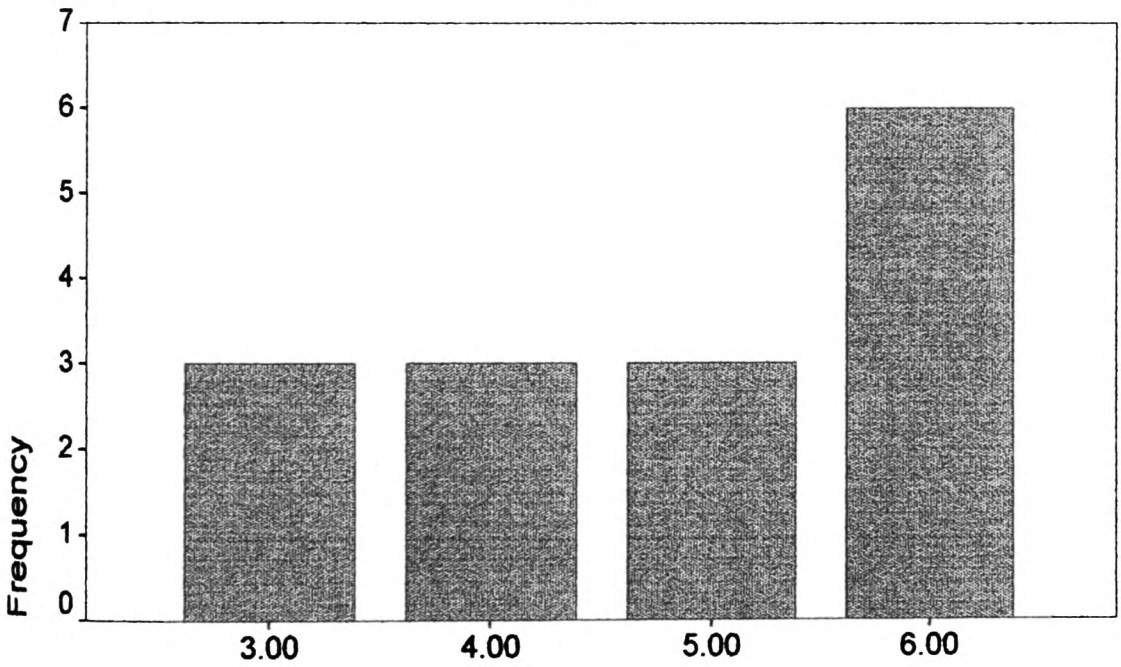
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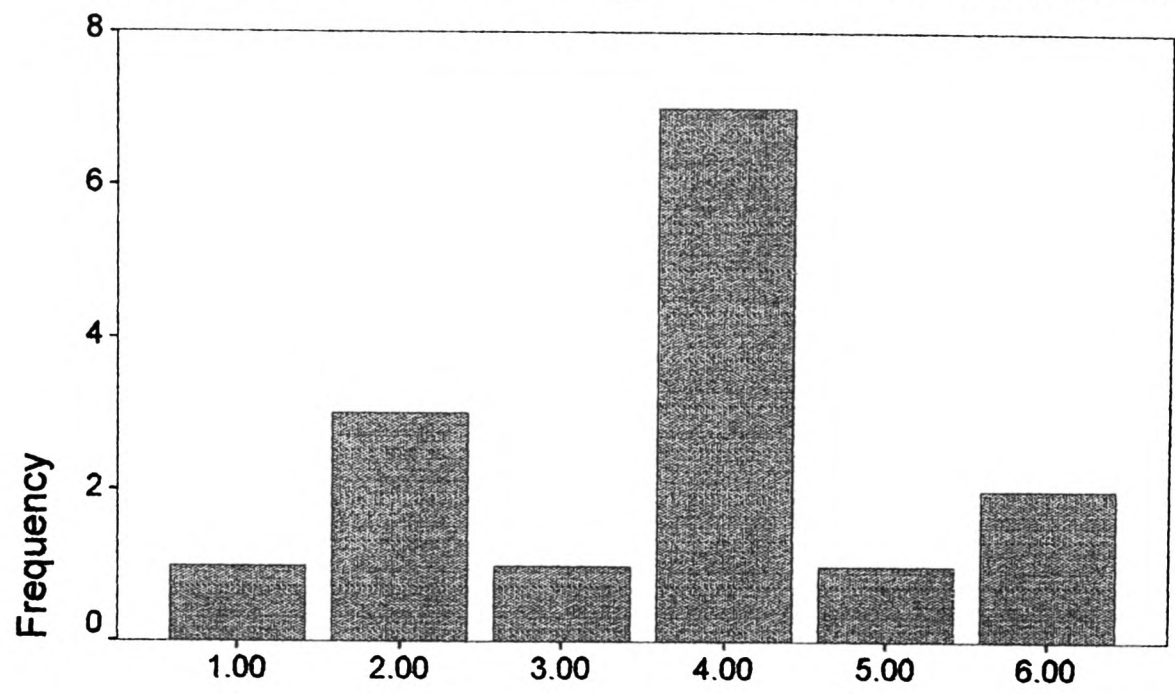
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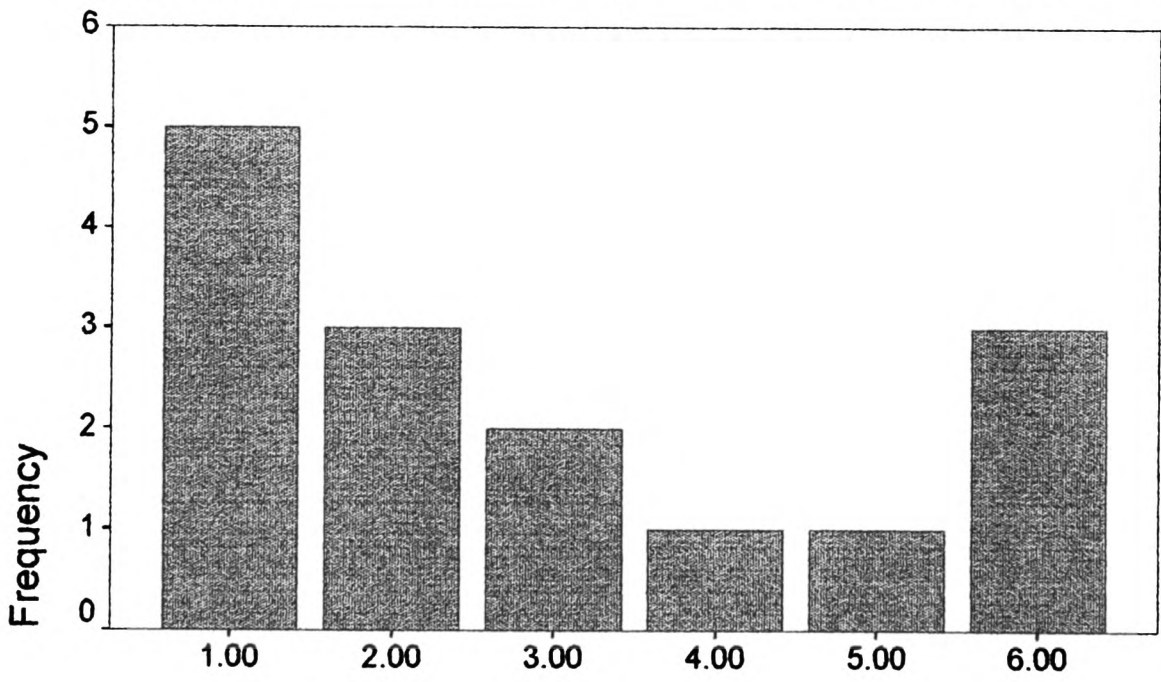
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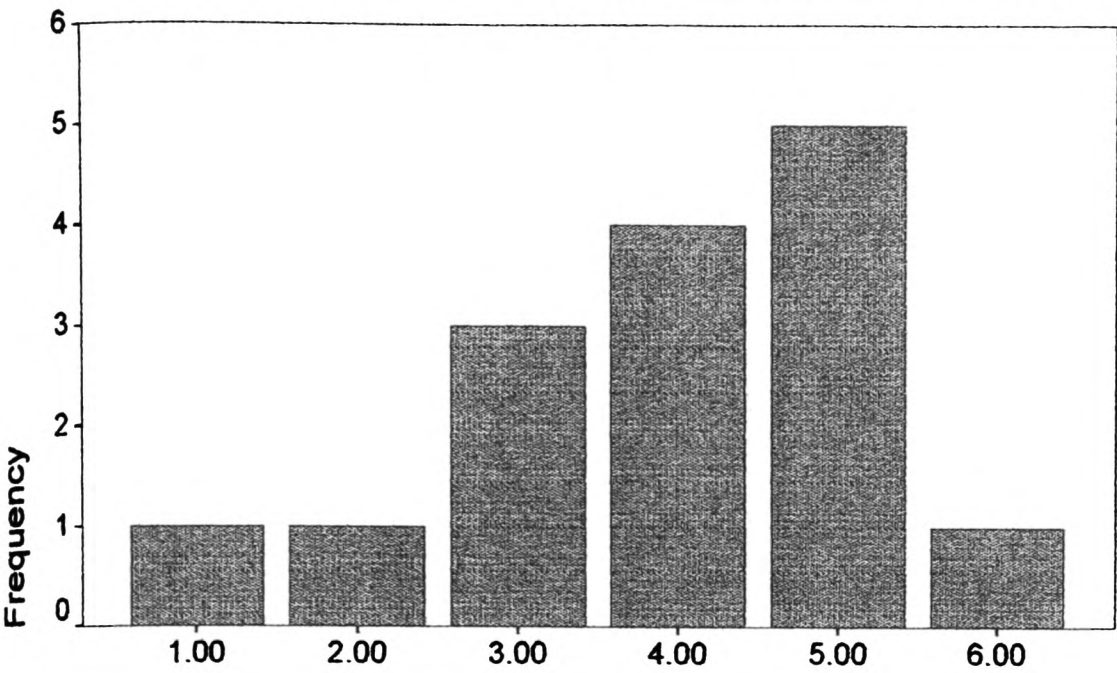
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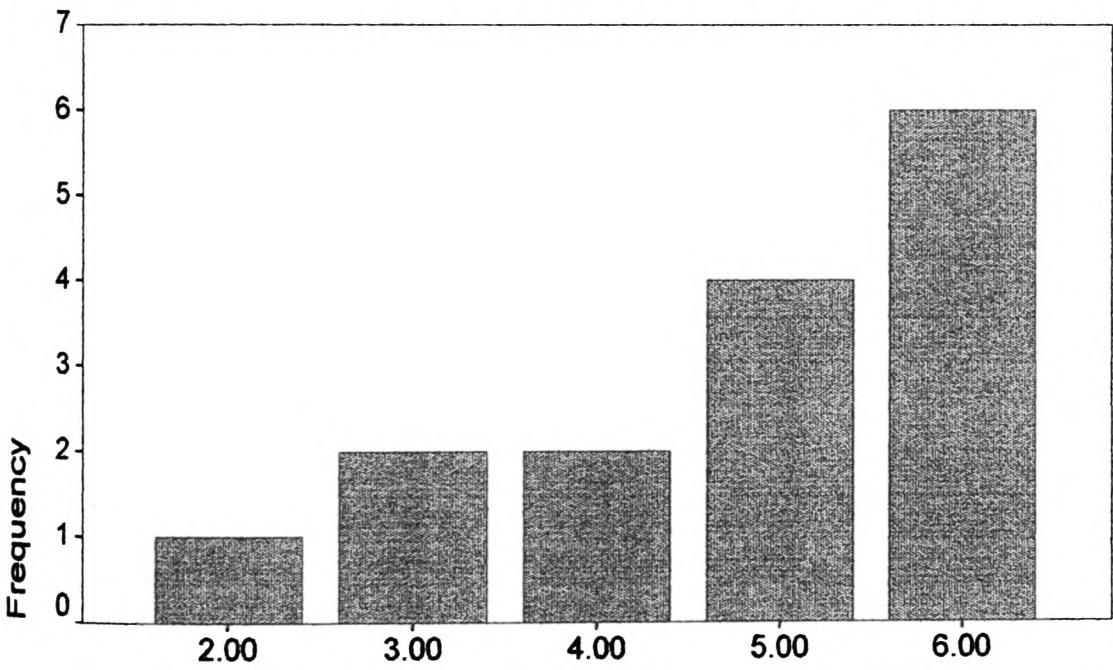
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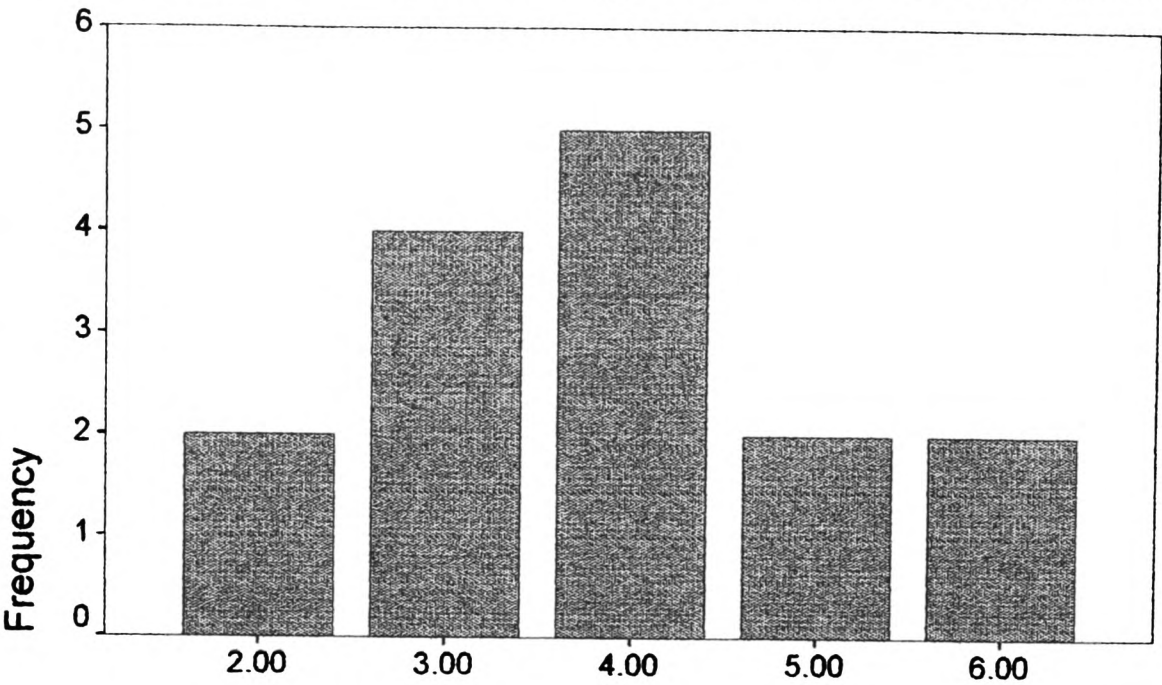
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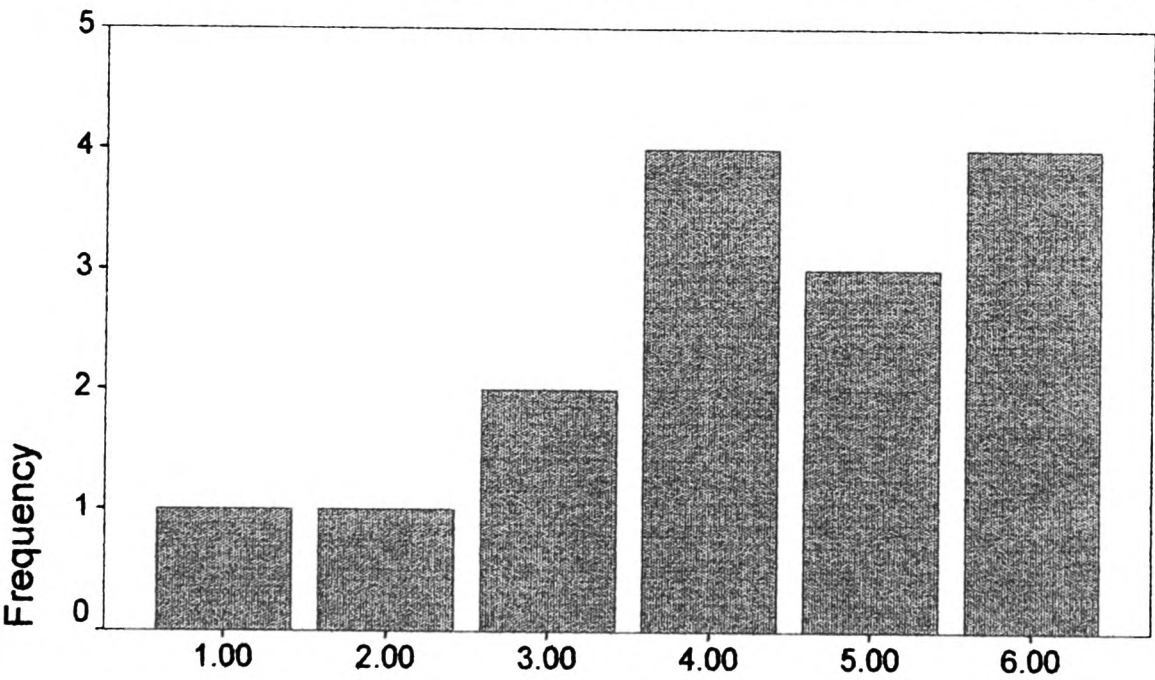
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q40

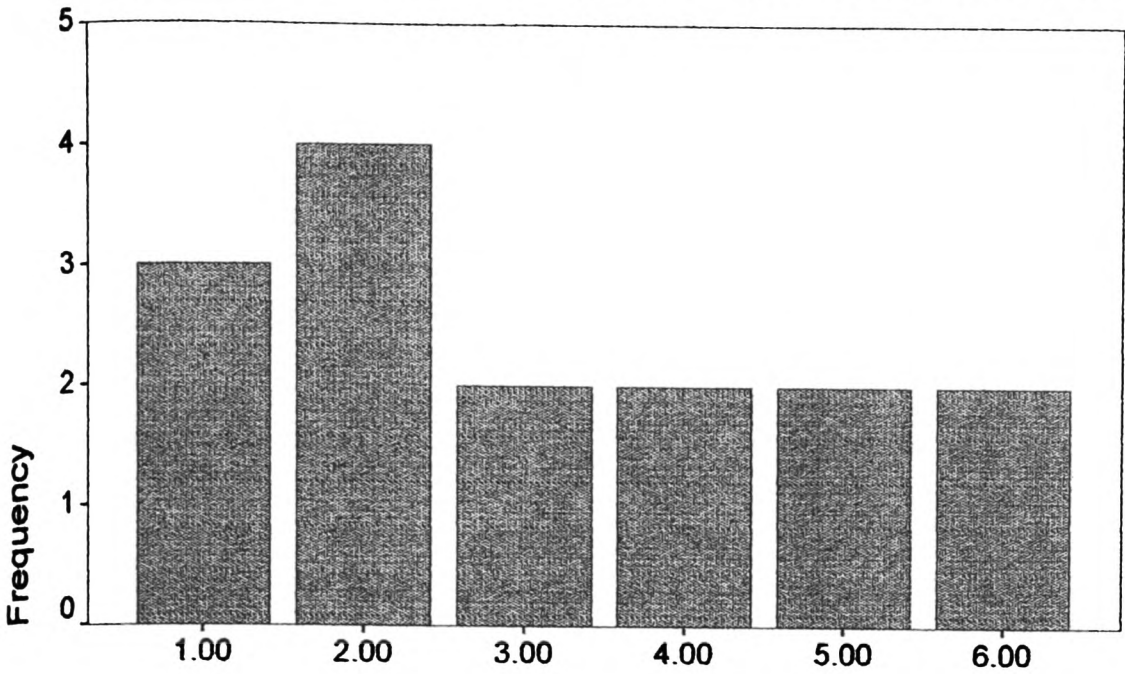
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q40

q41

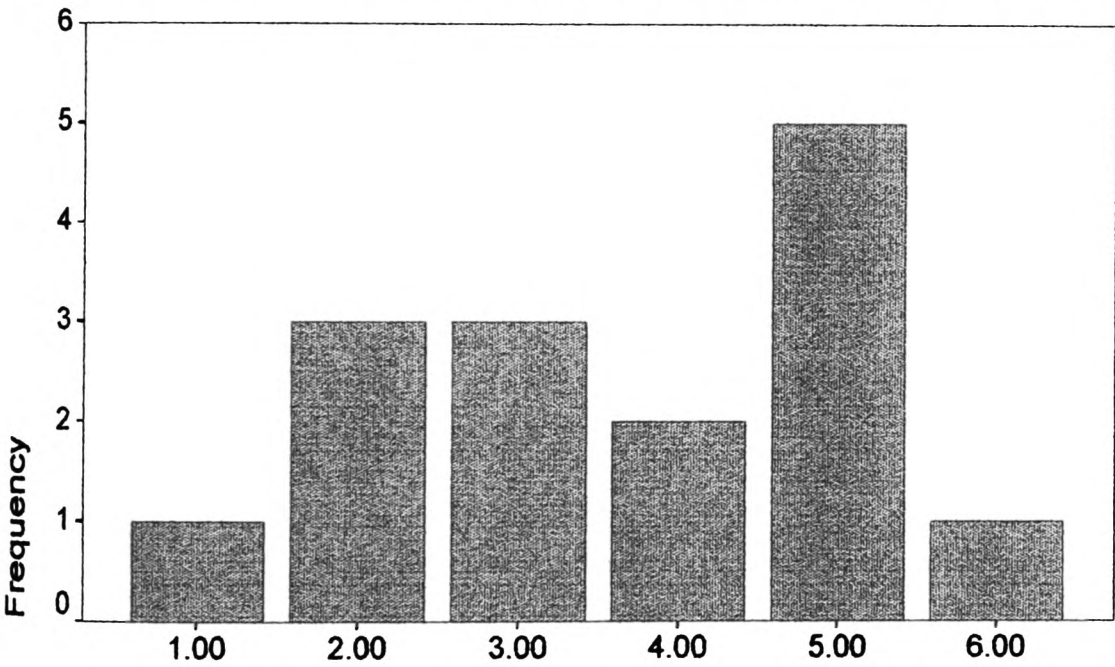
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q41

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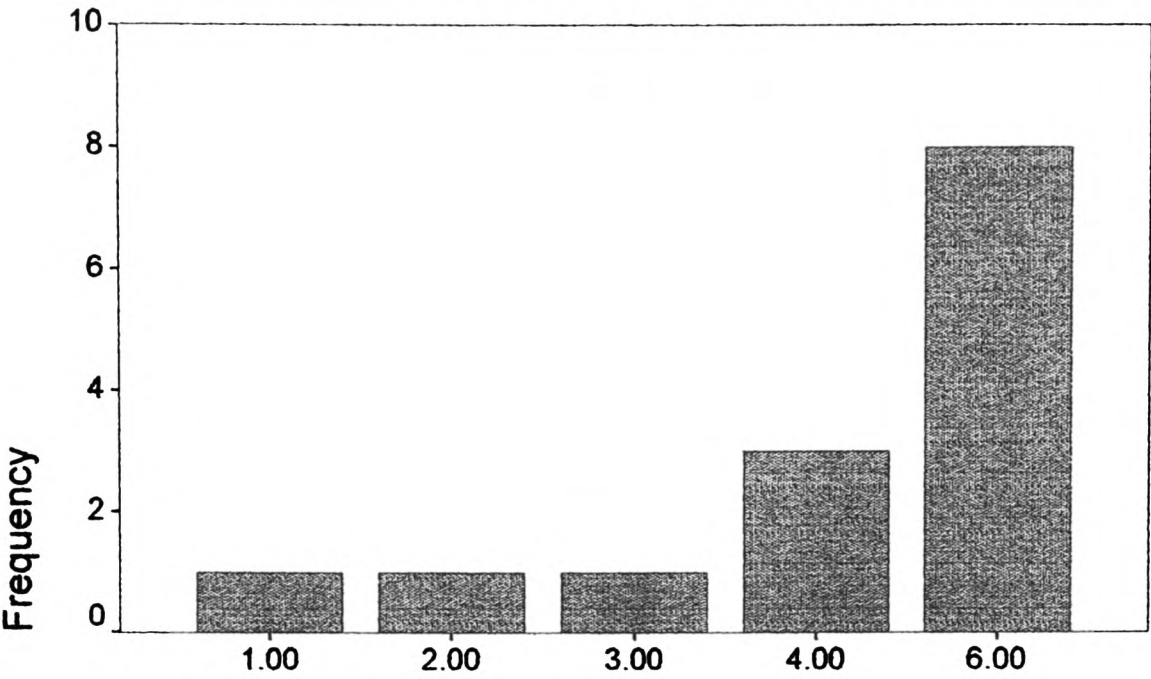
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q42

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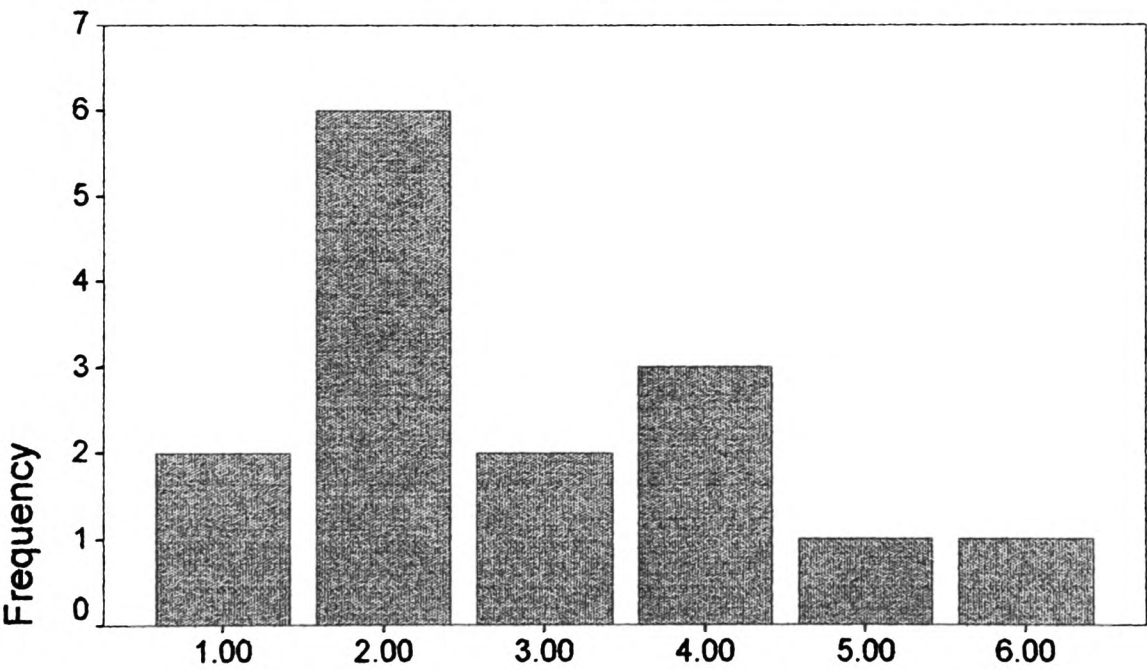
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q43

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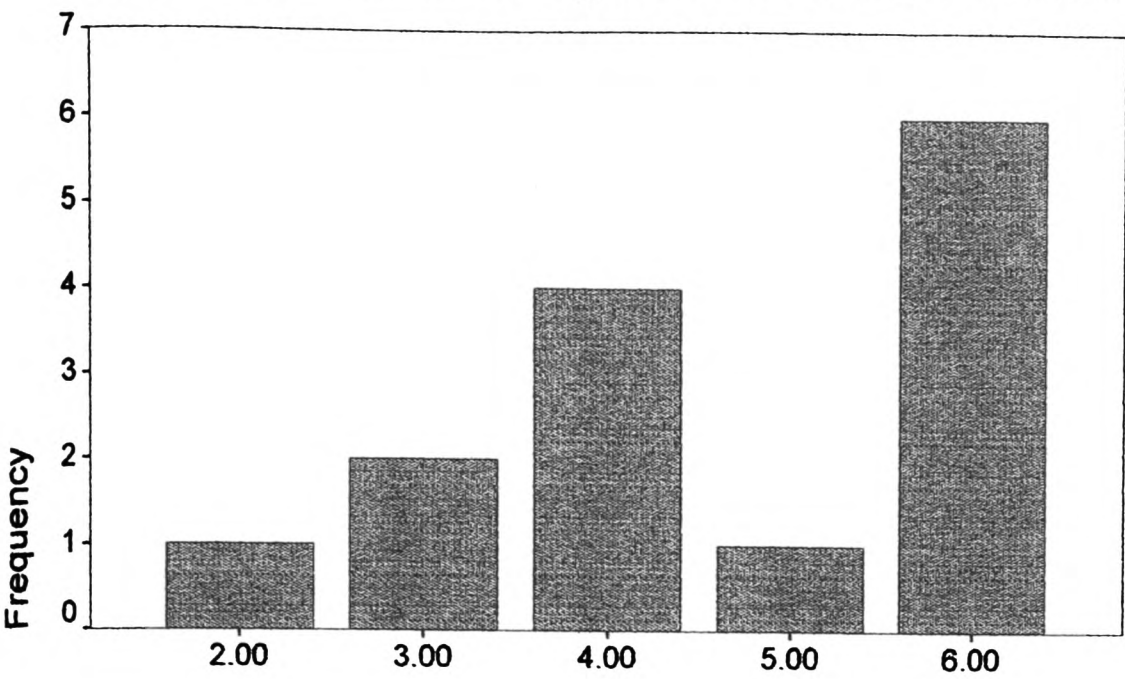
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q44

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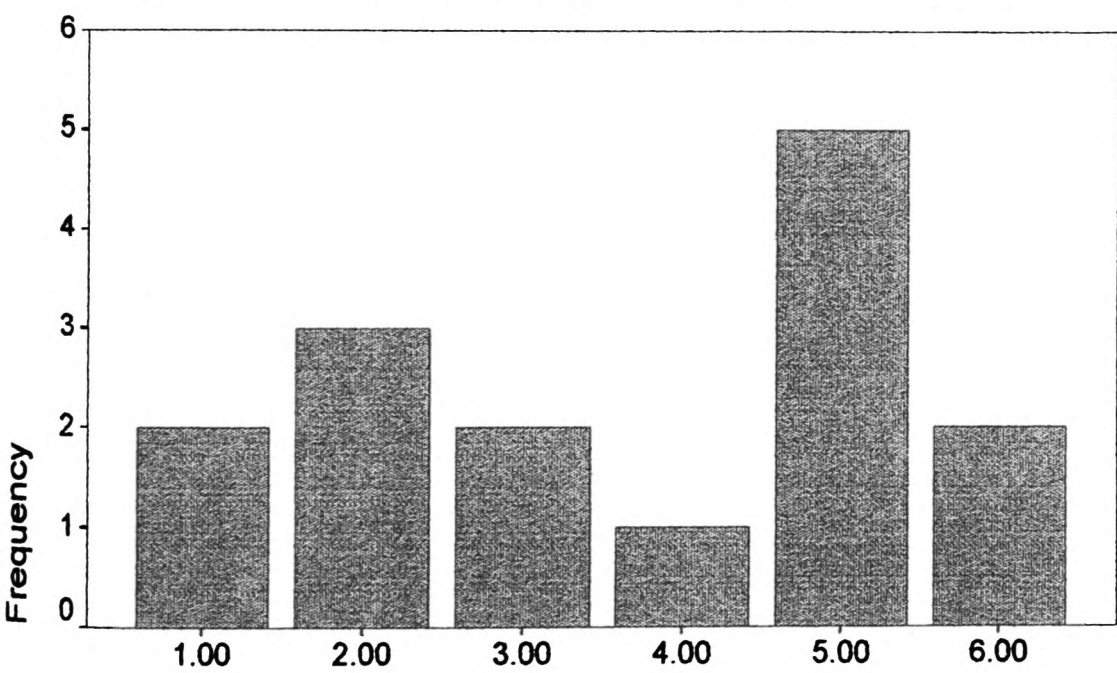
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q45

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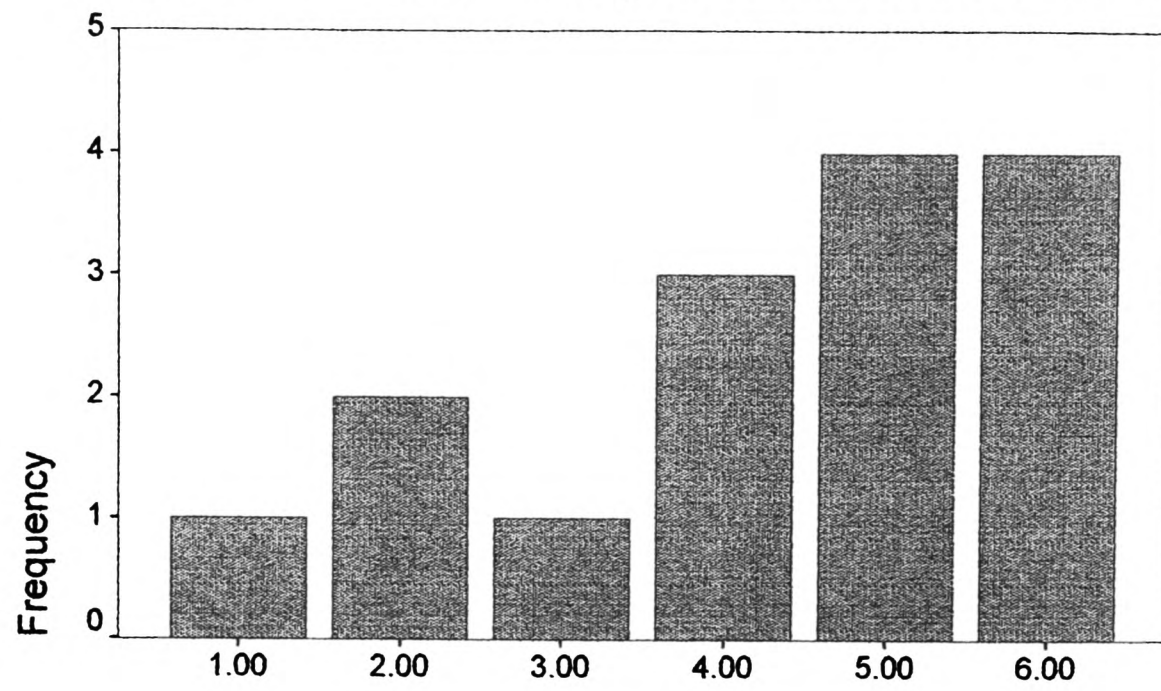
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q46

q47

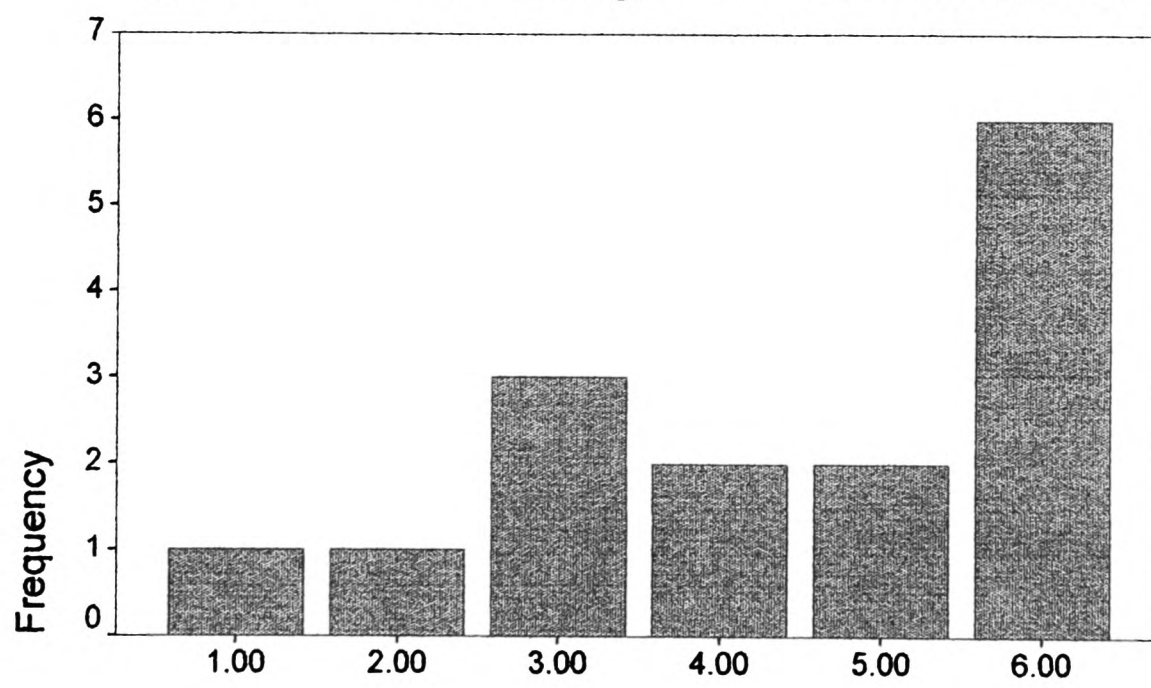
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q47

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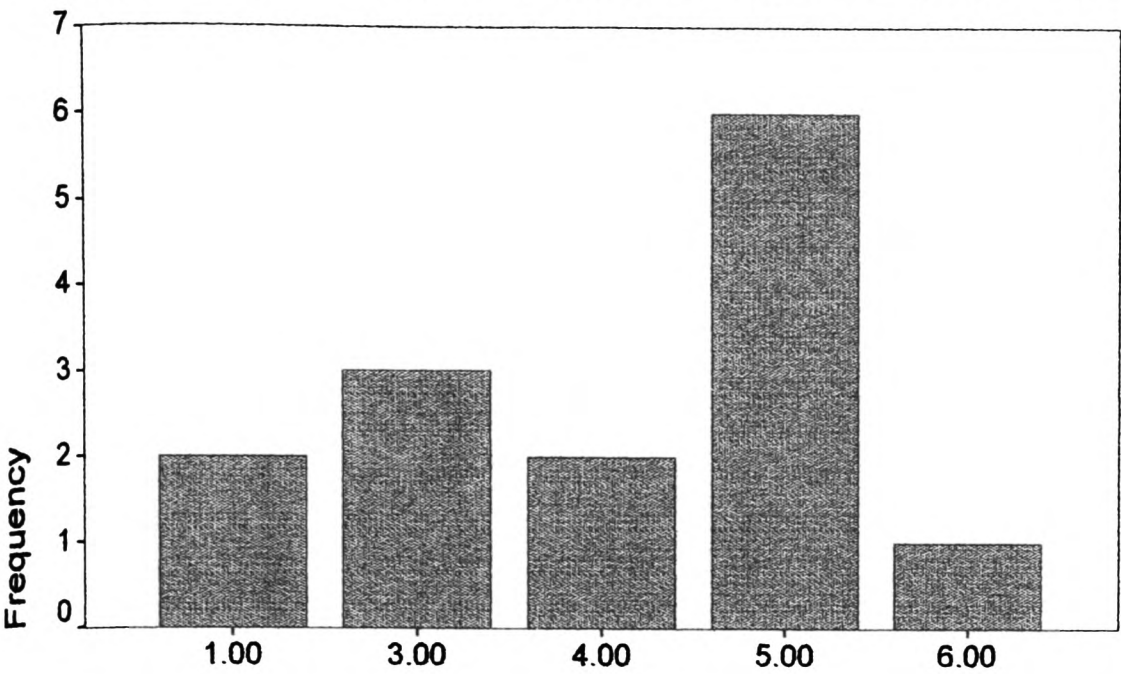
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q48

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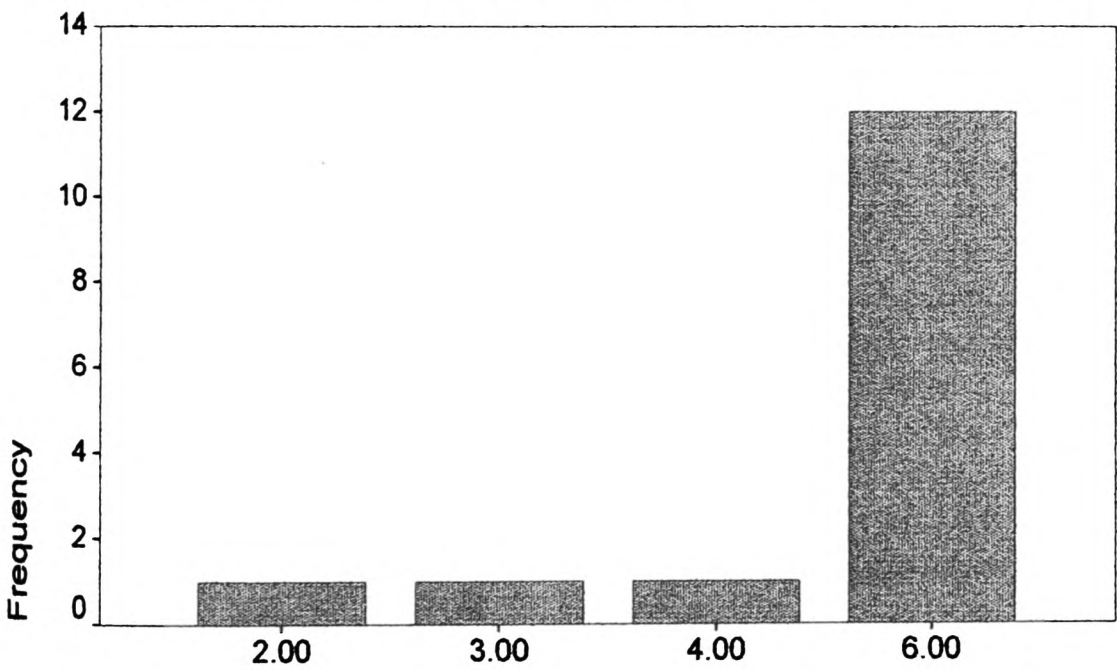
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q49

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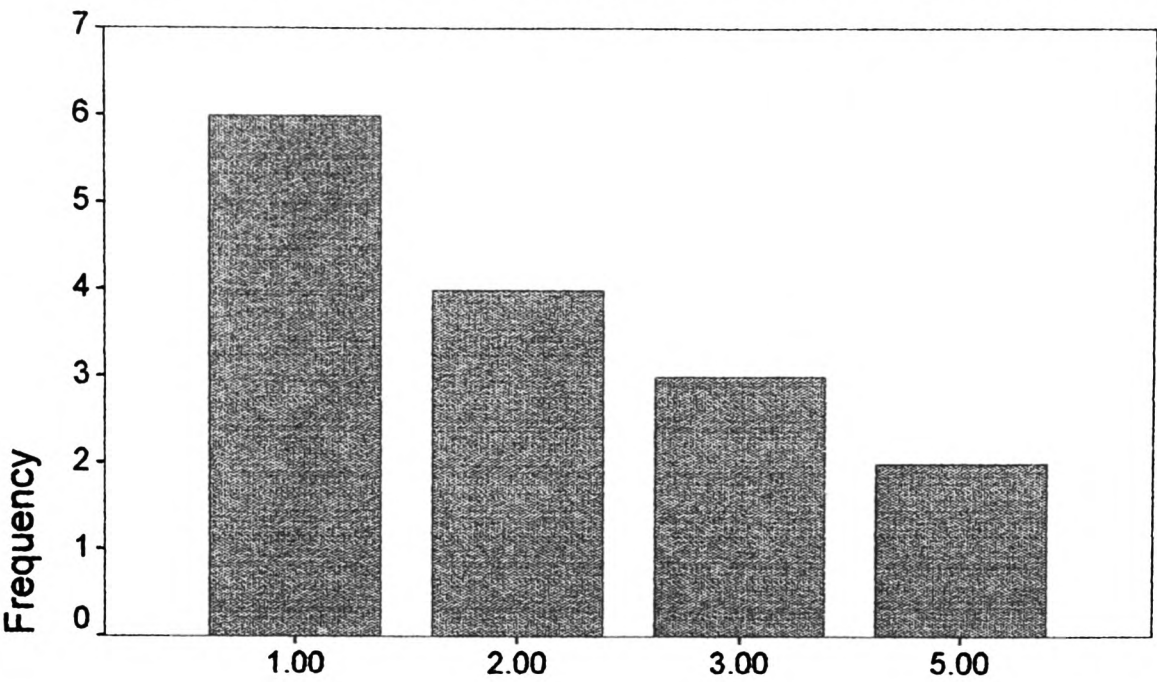
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q50

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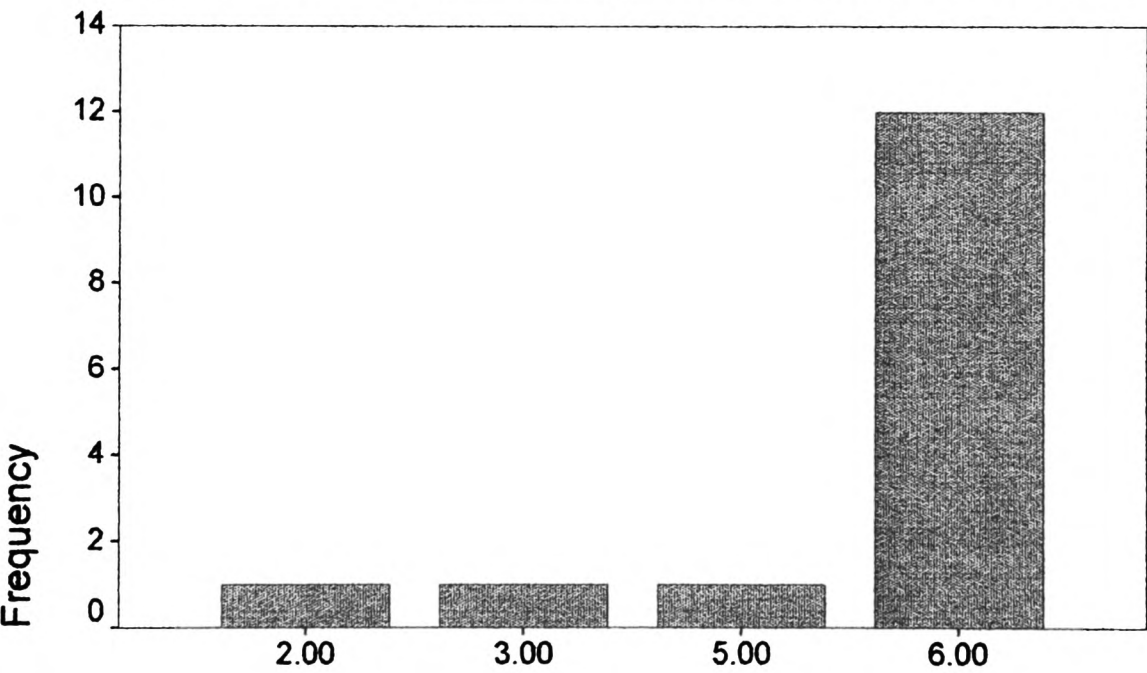
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q51

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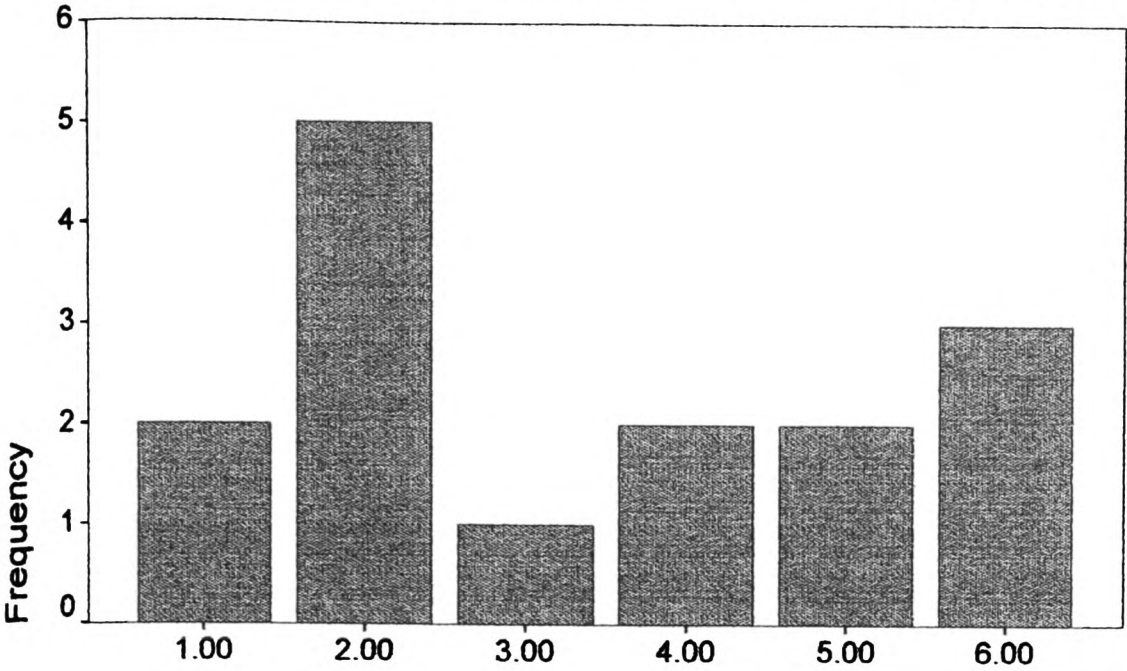
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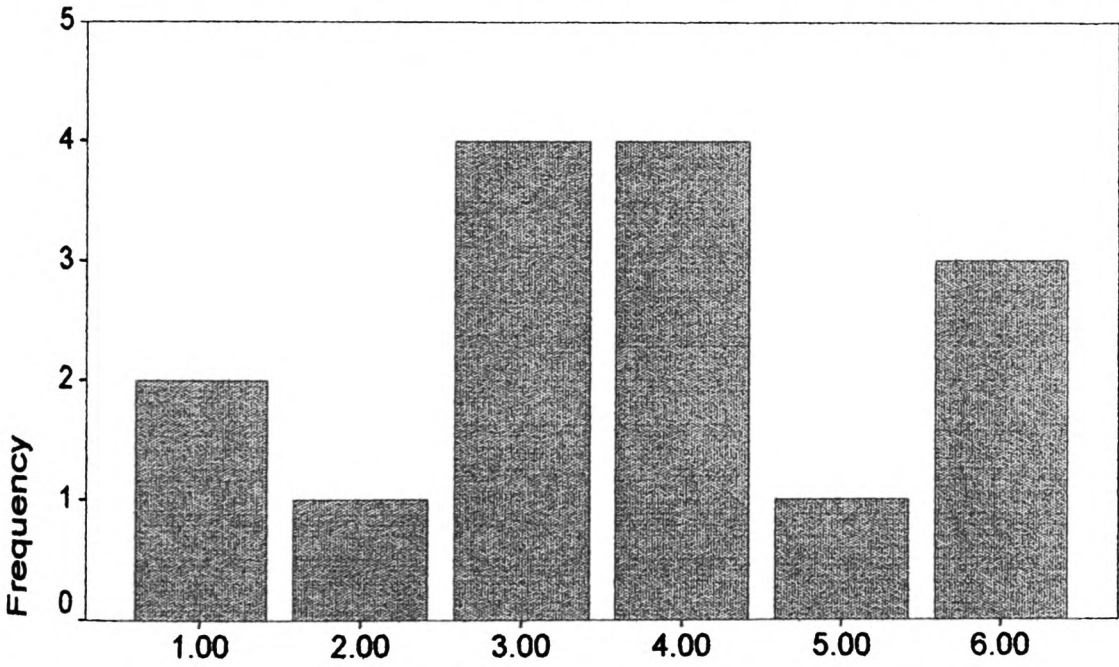
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q53

q54

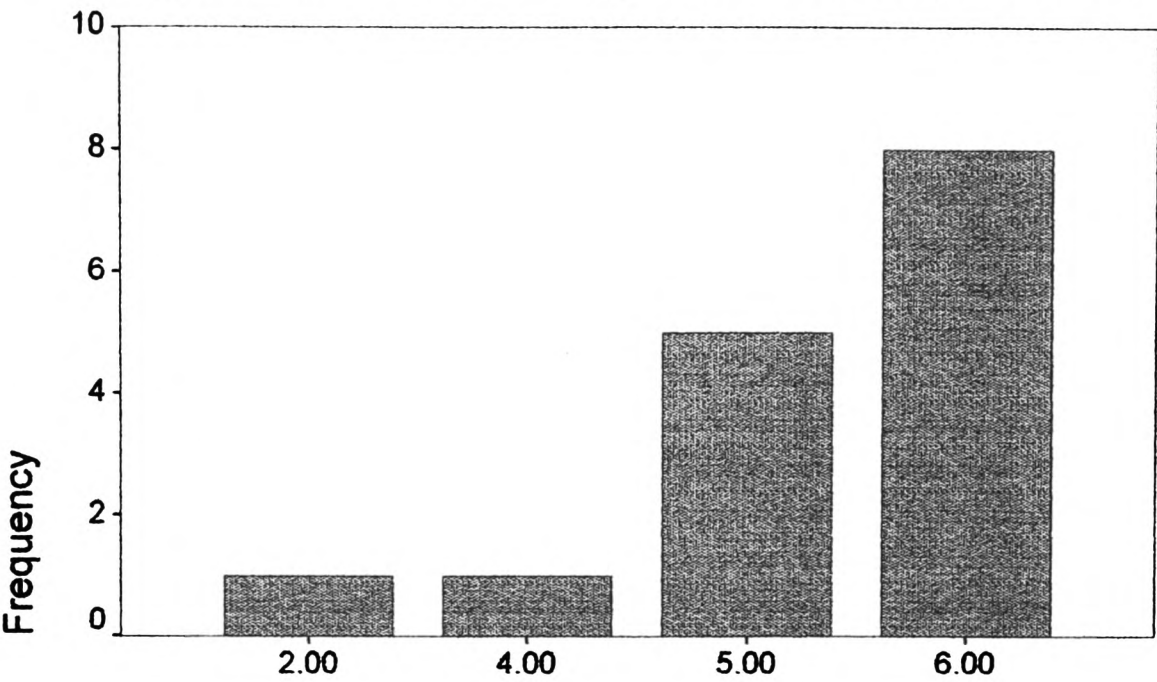
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q54

q55

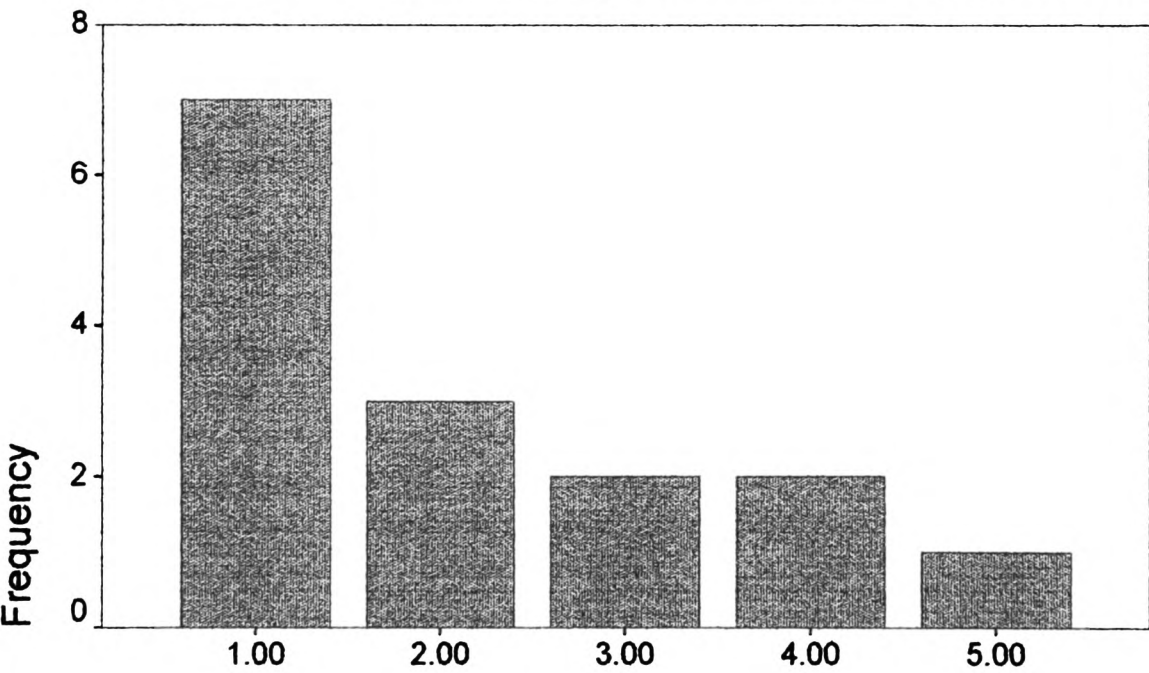
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q55

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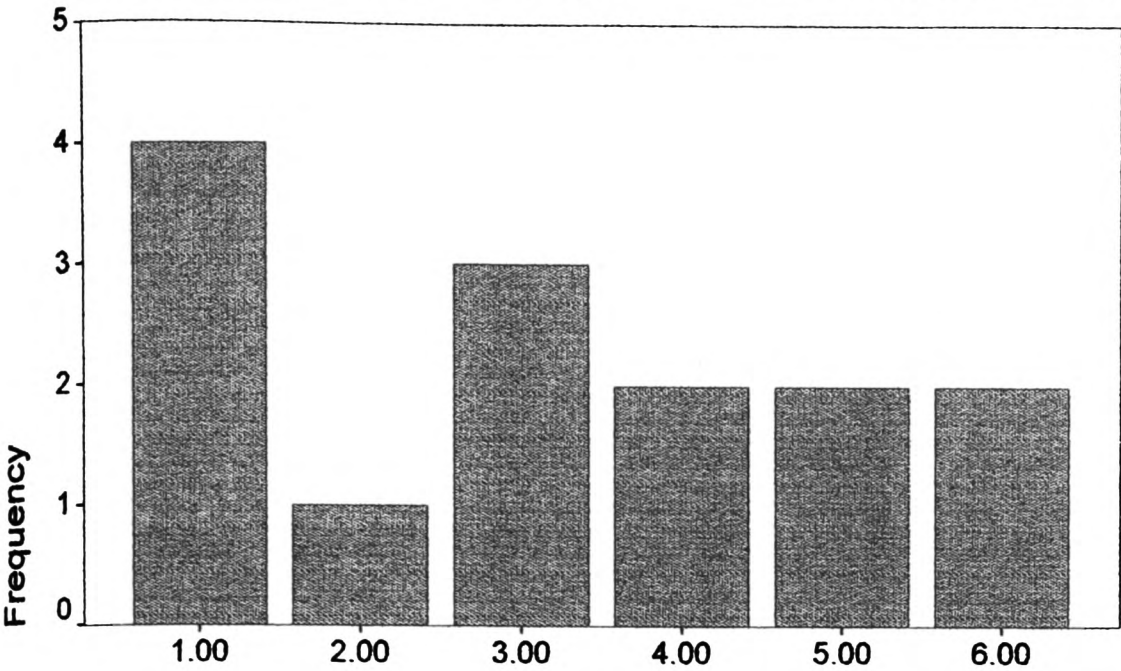
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q56

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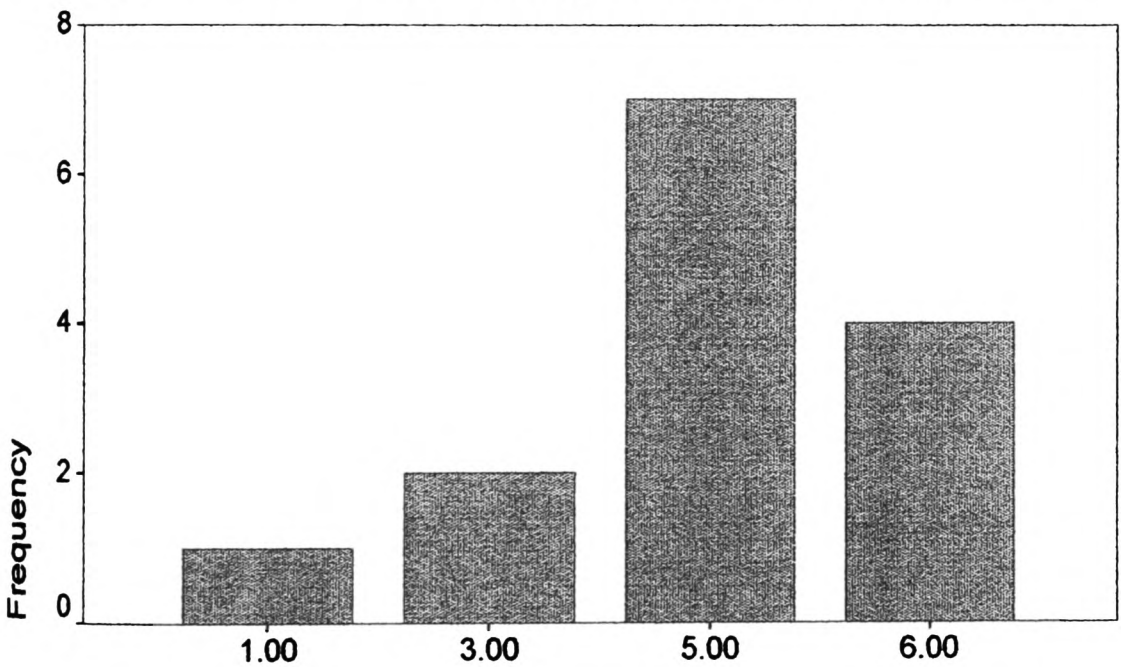
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q57

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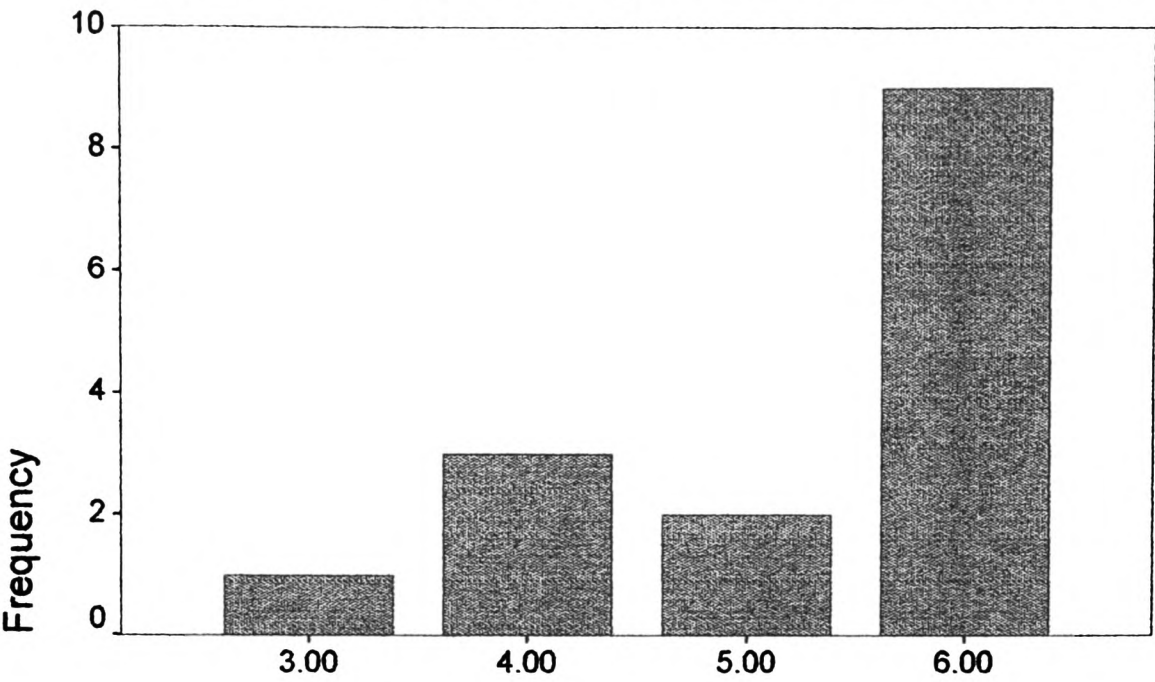
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q58

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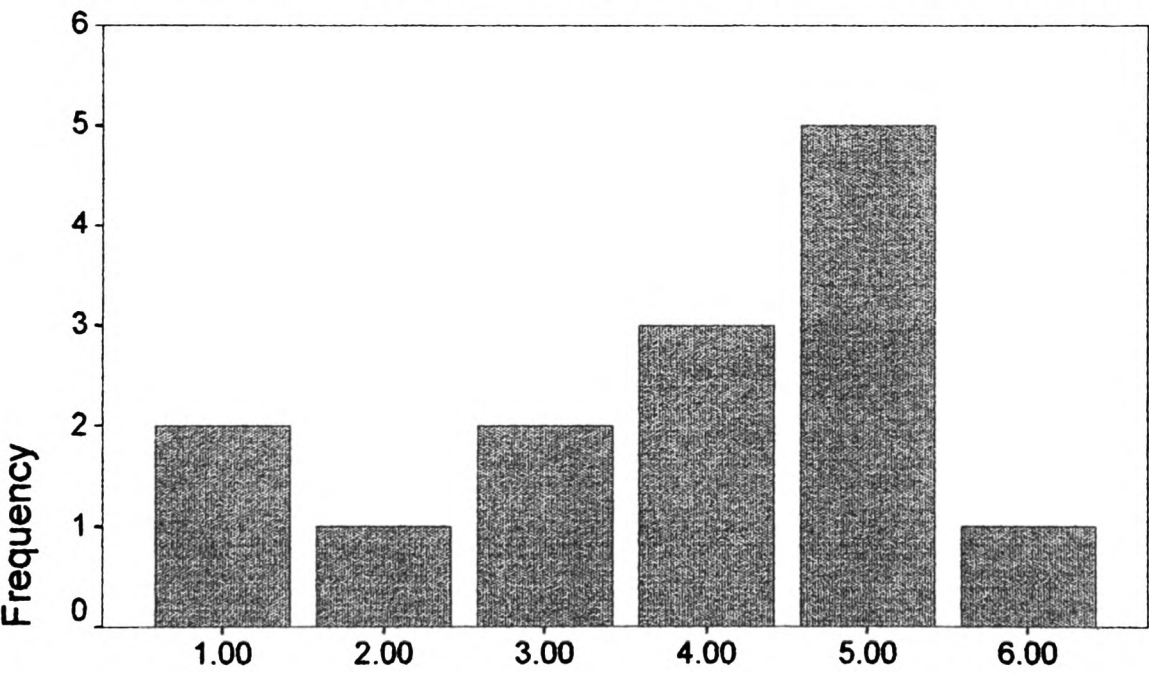
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q60

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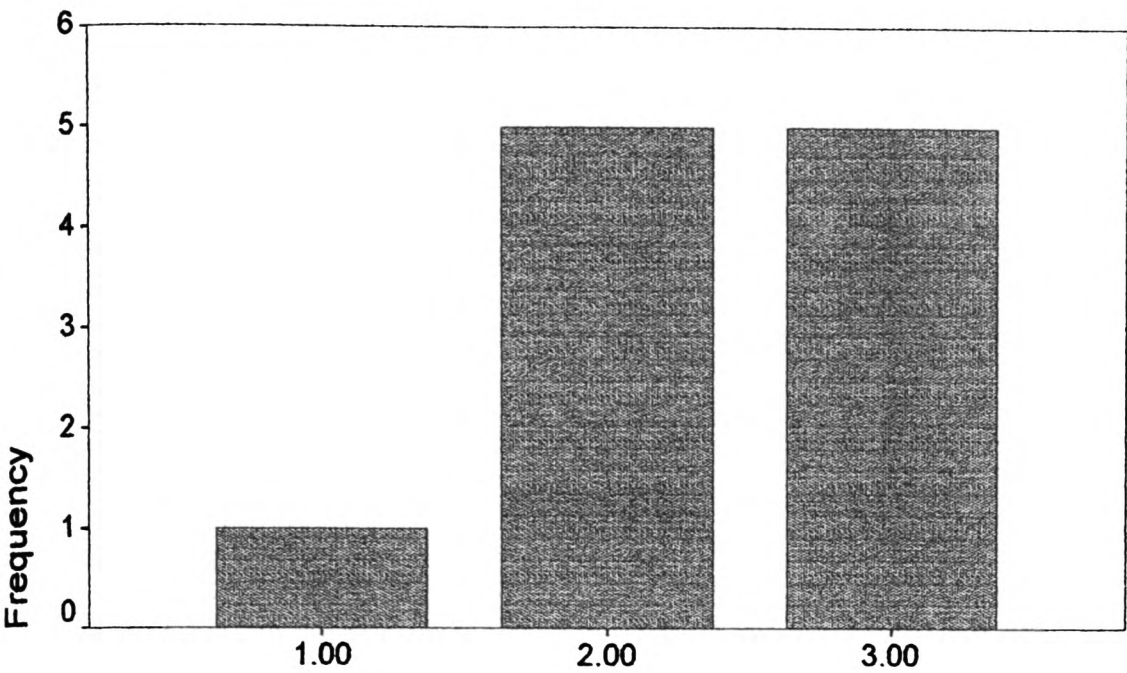


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Bar Chart

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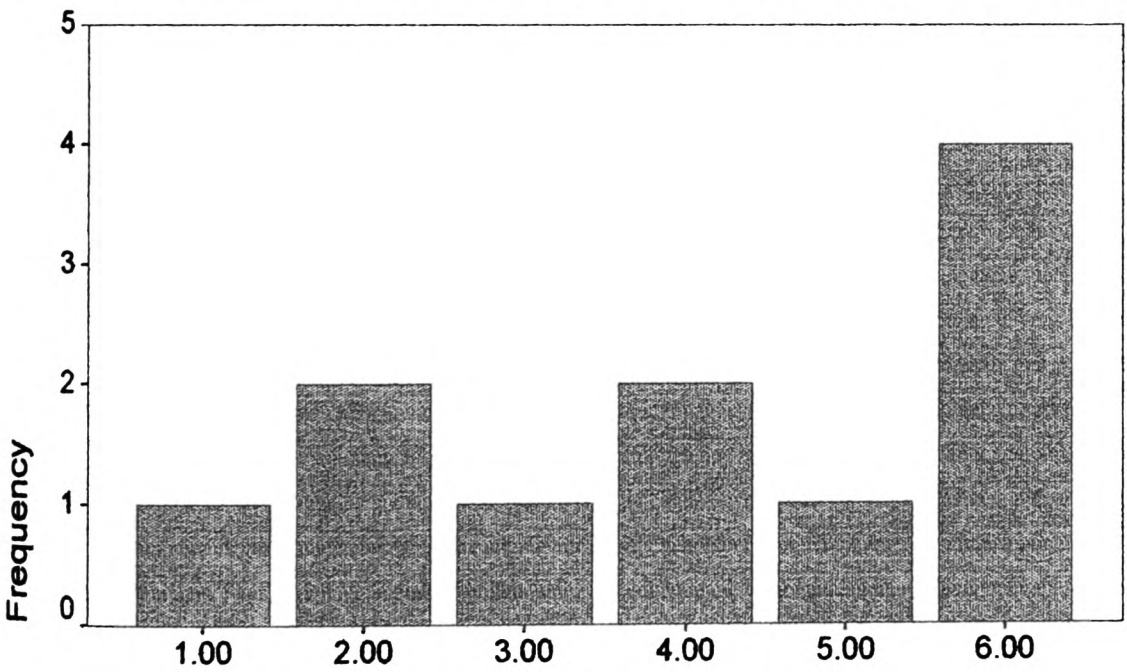
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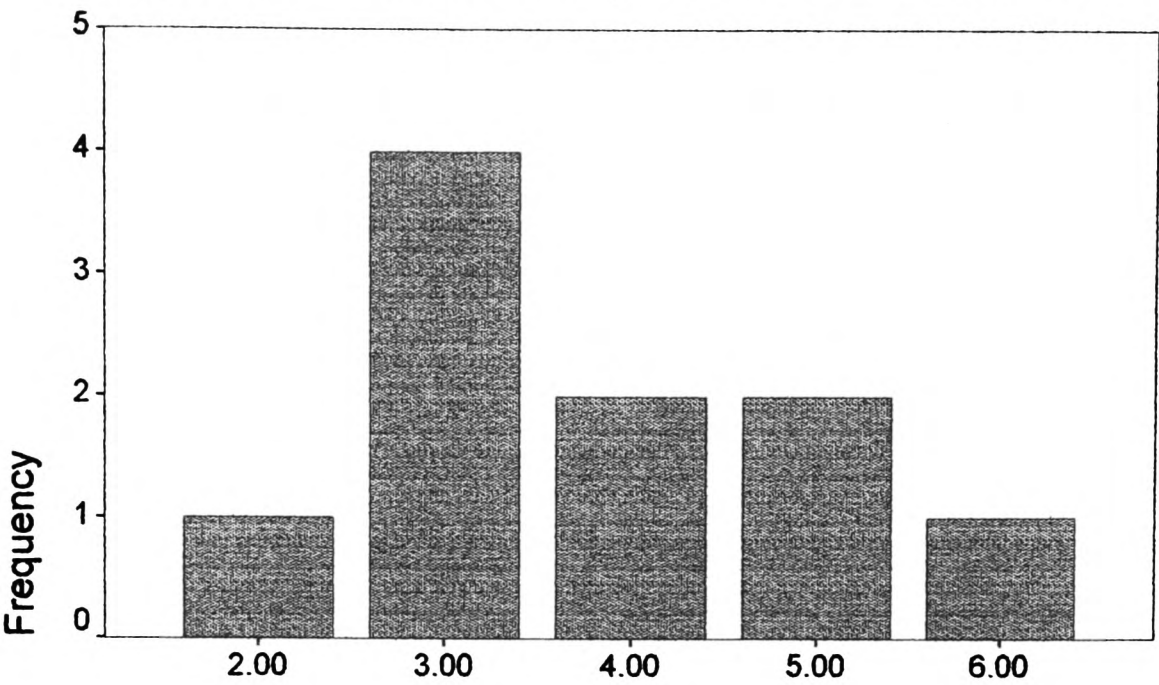
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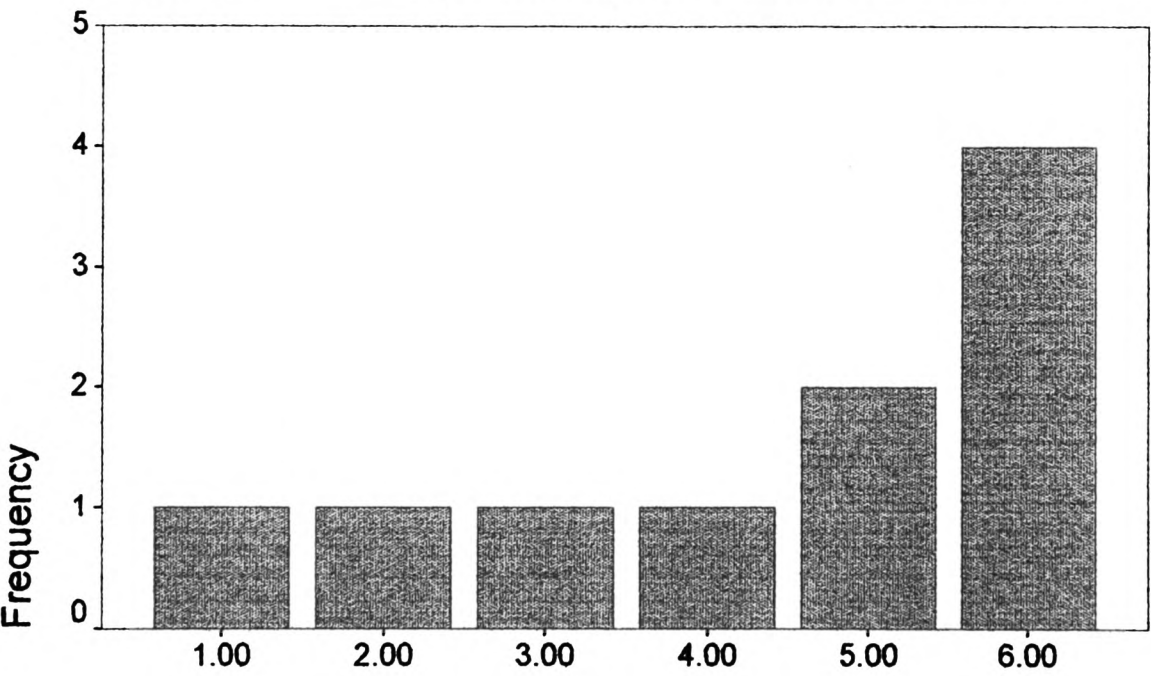
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q3

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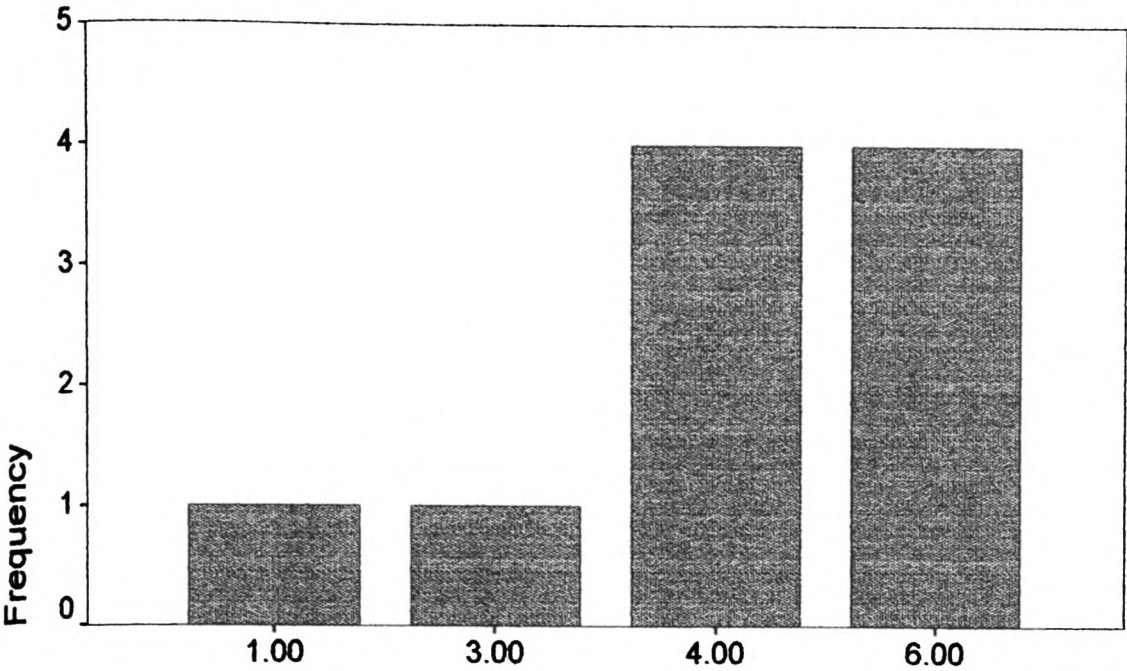
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q4

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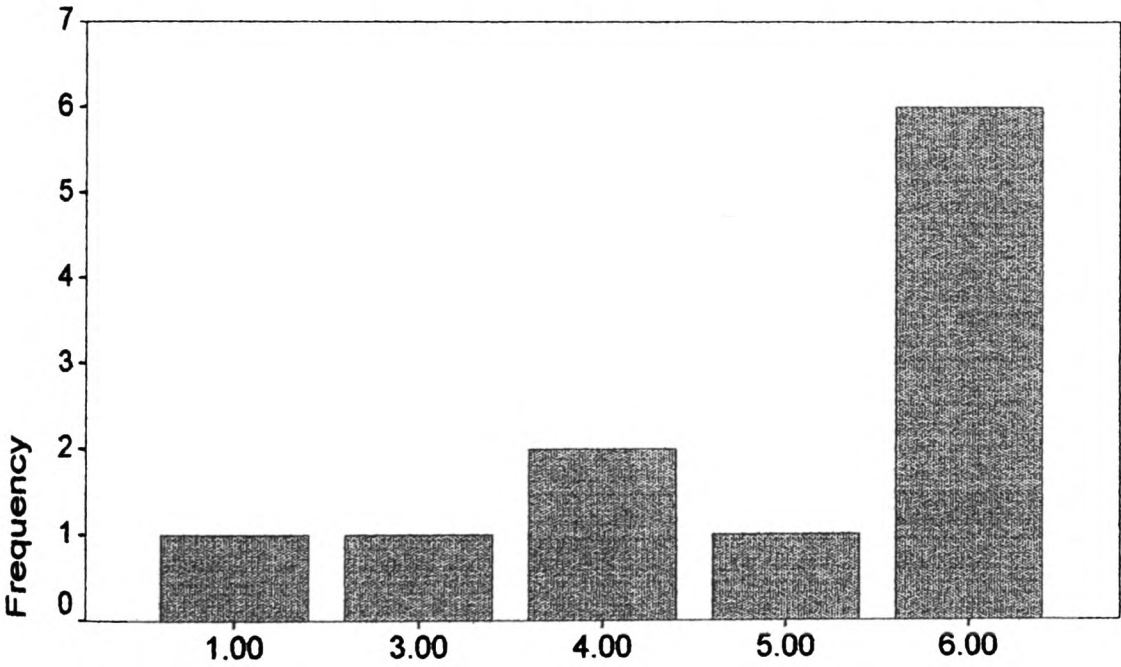
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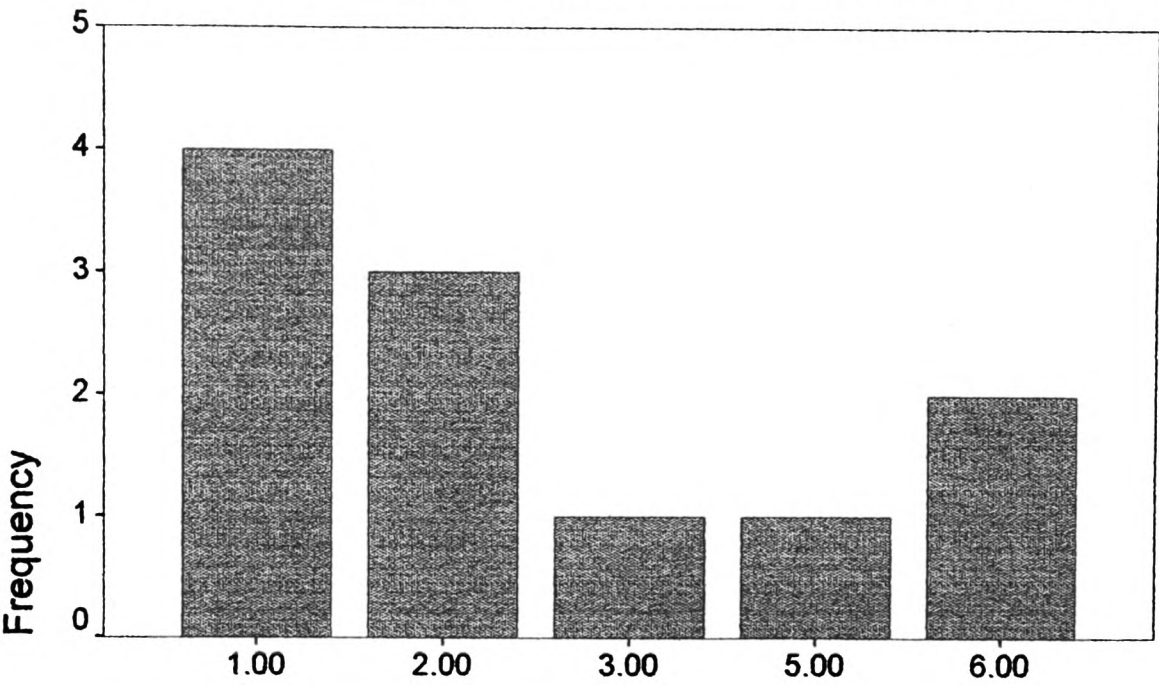
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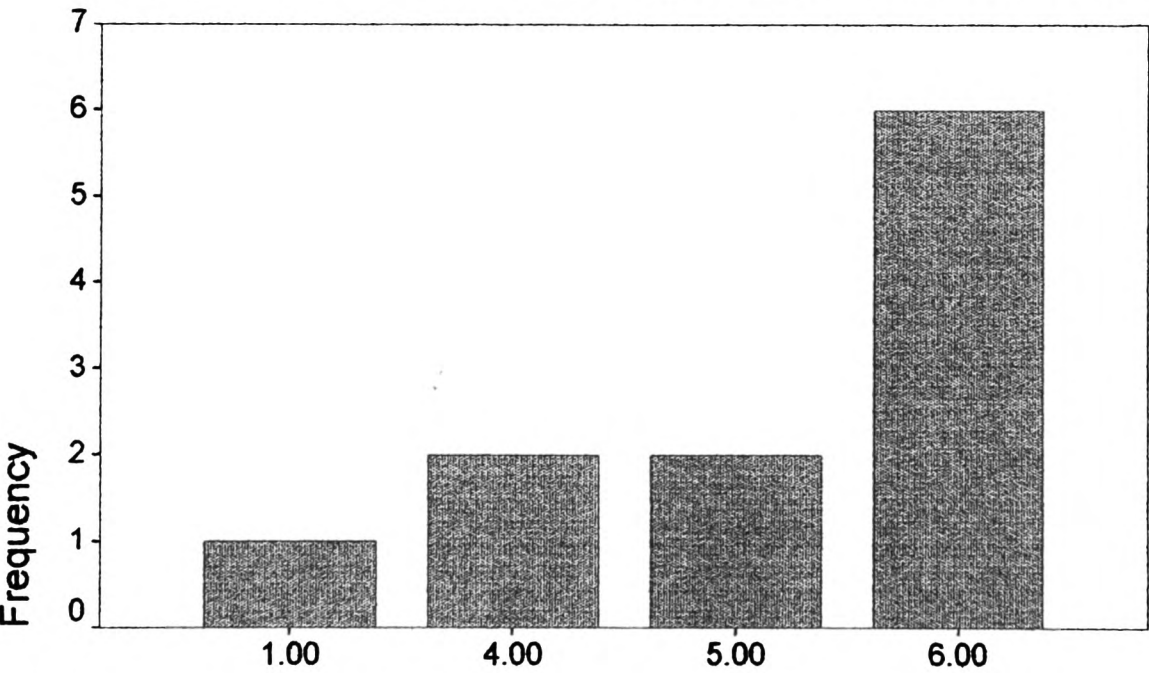
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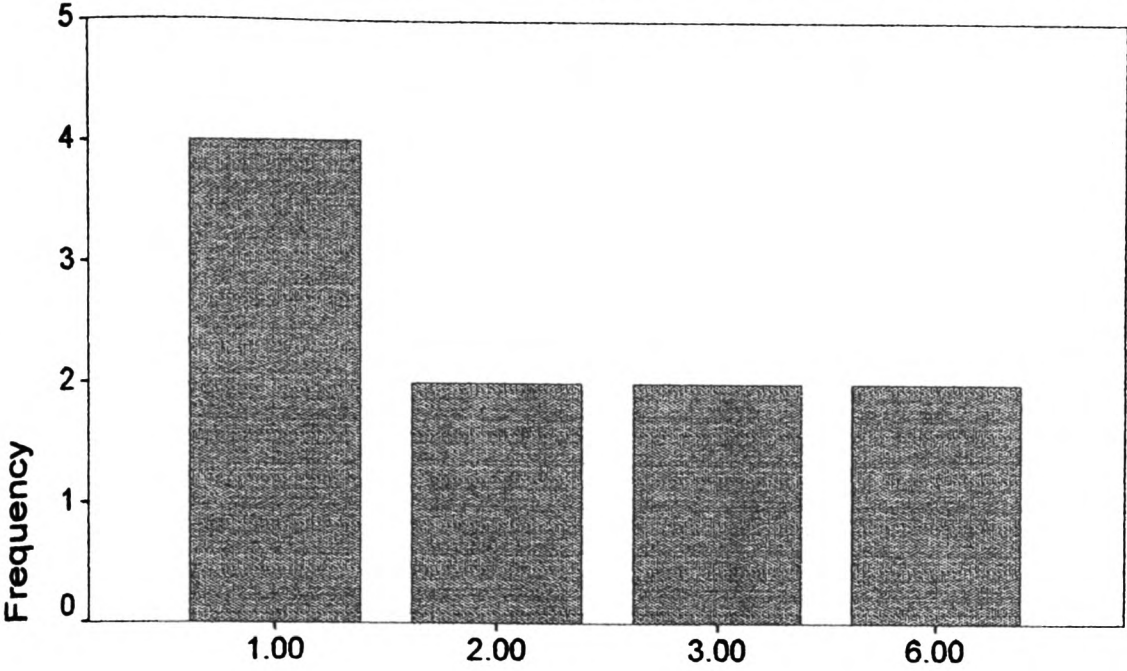
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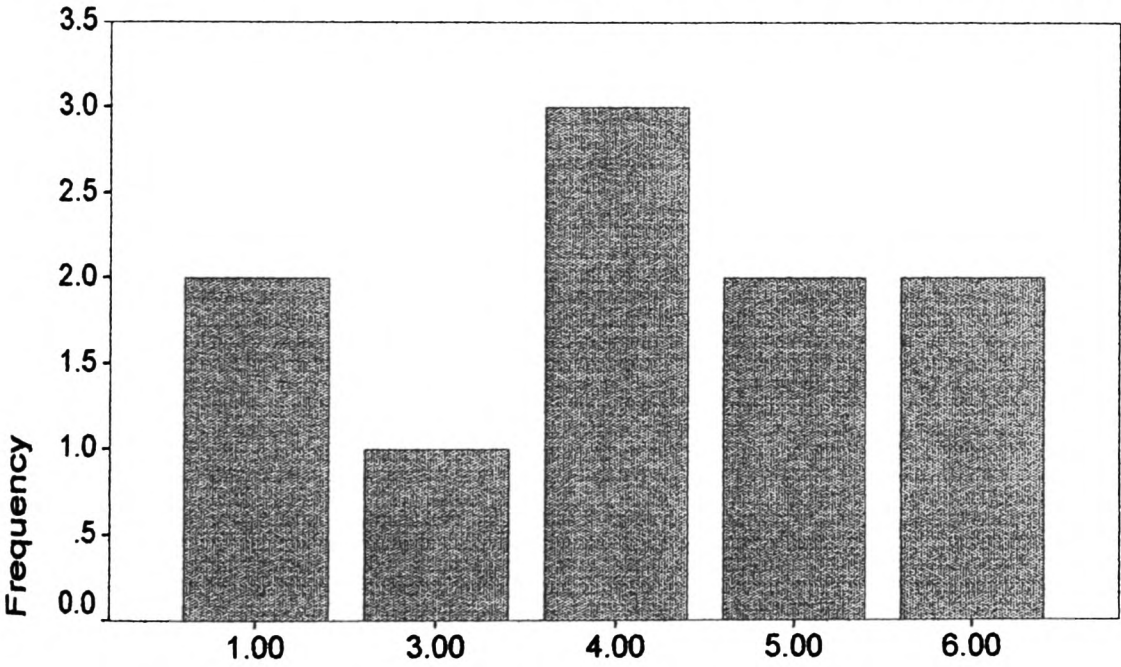
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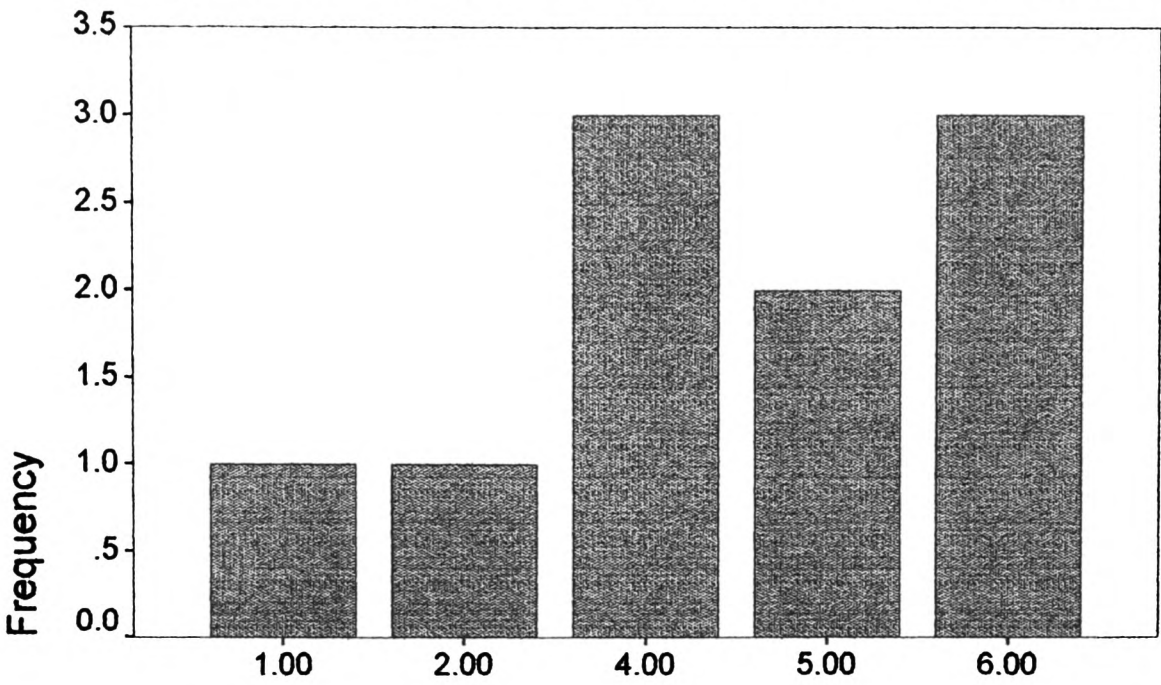
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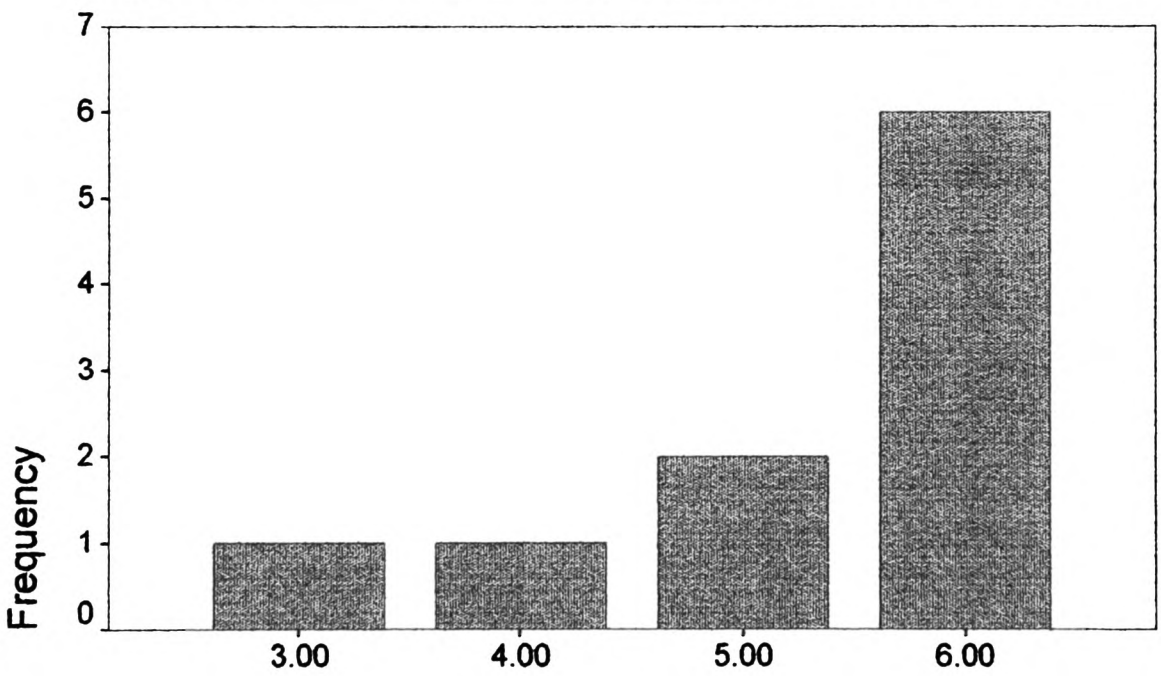
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q11

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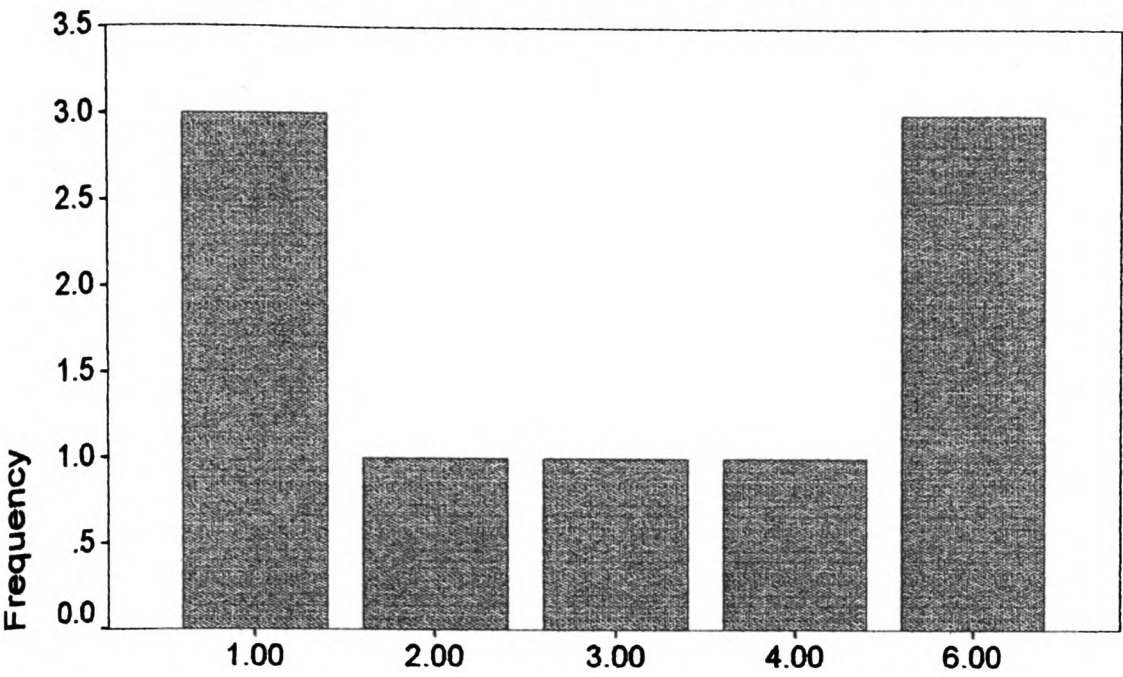
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q12

q13

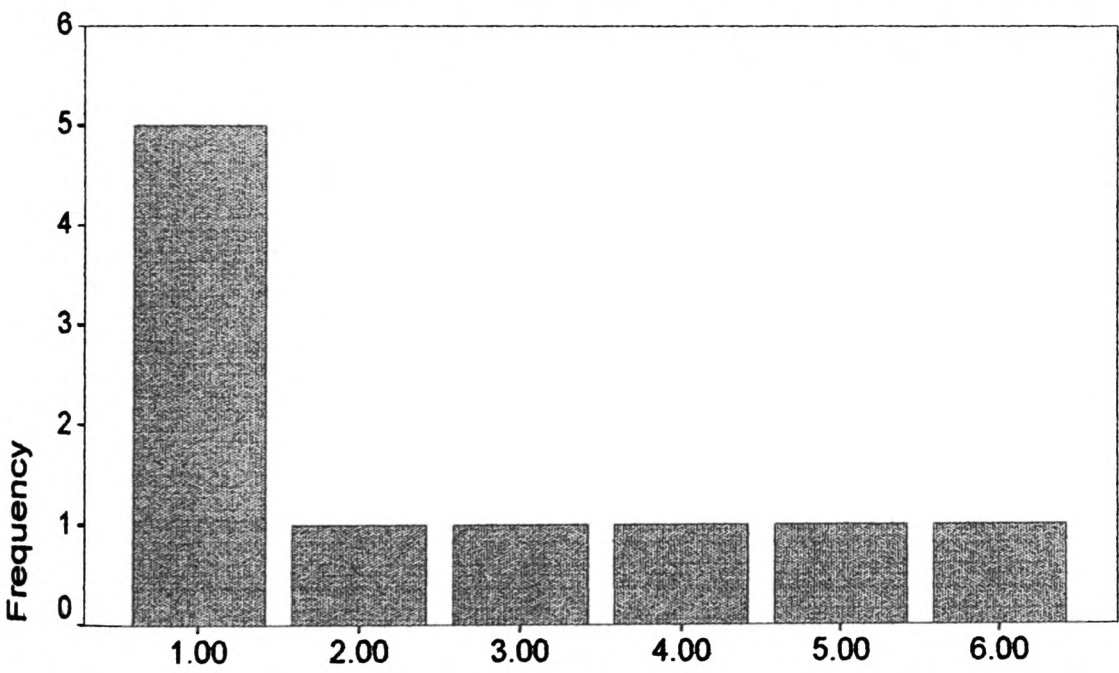
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q13

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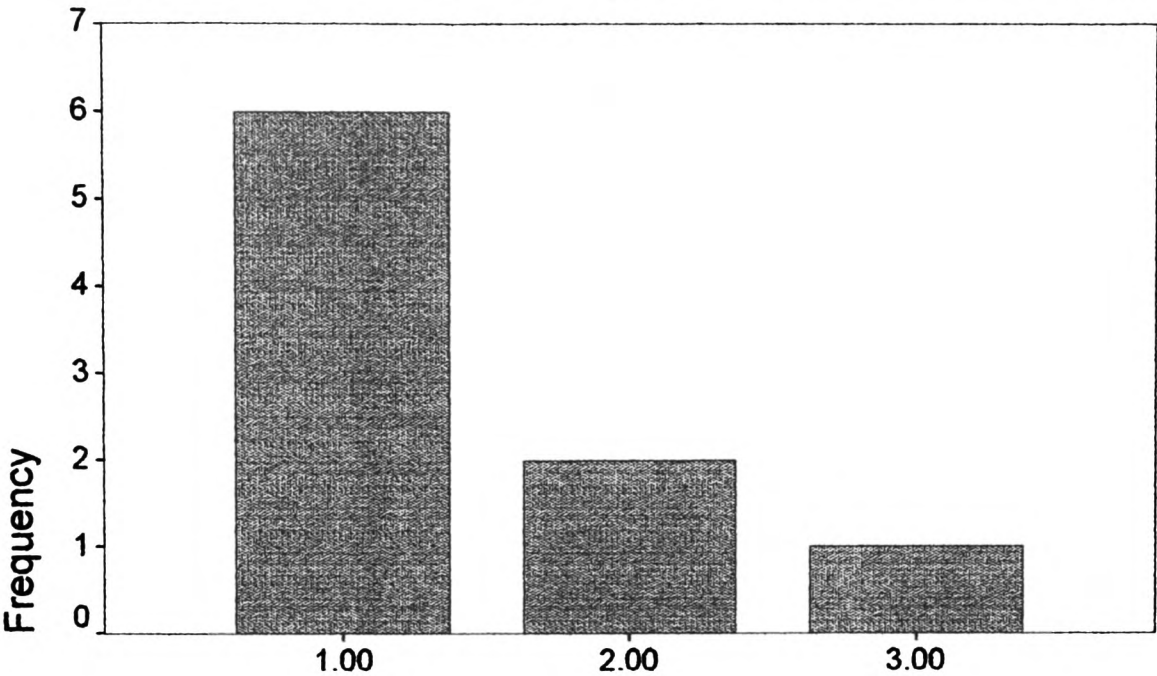
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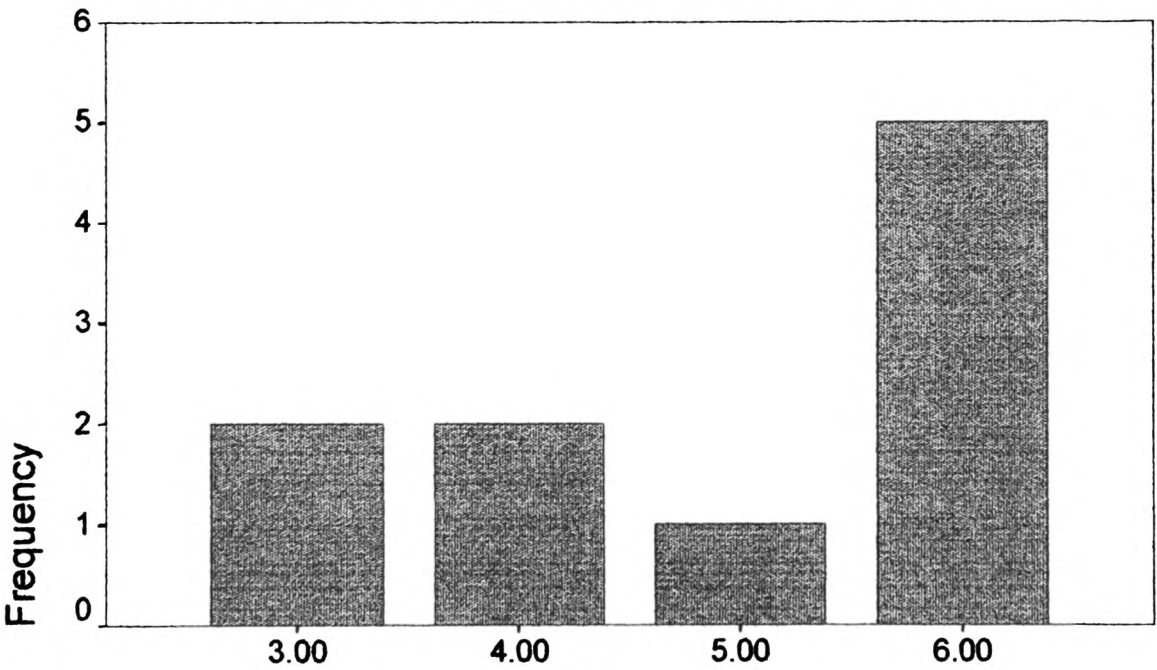
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q15

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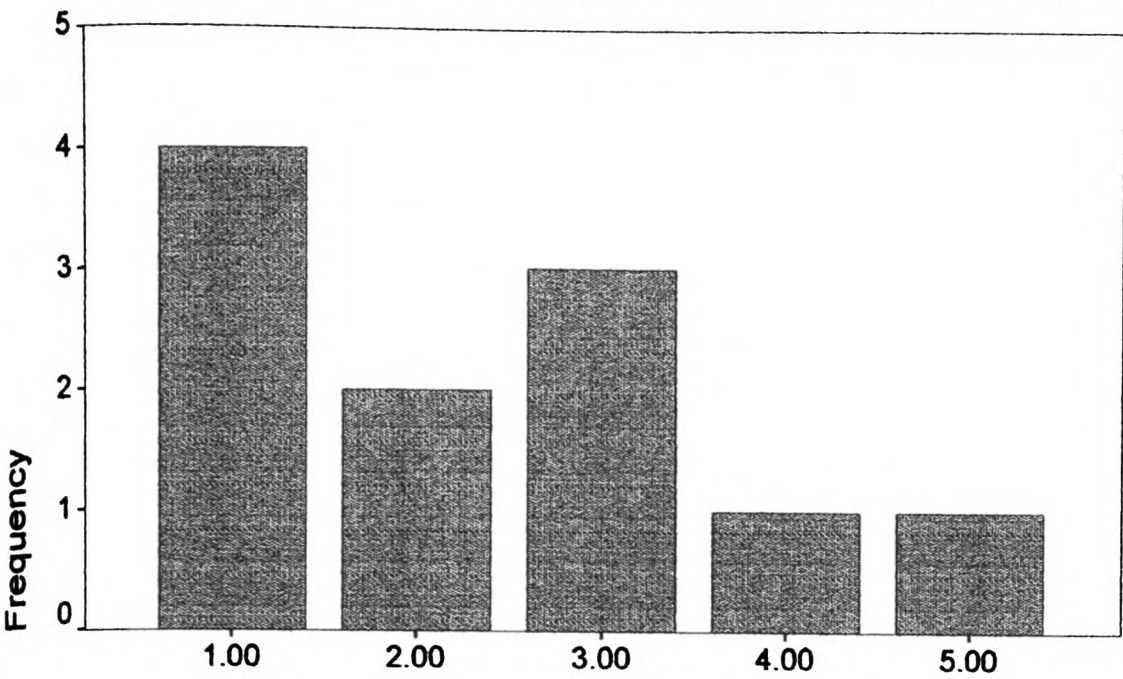
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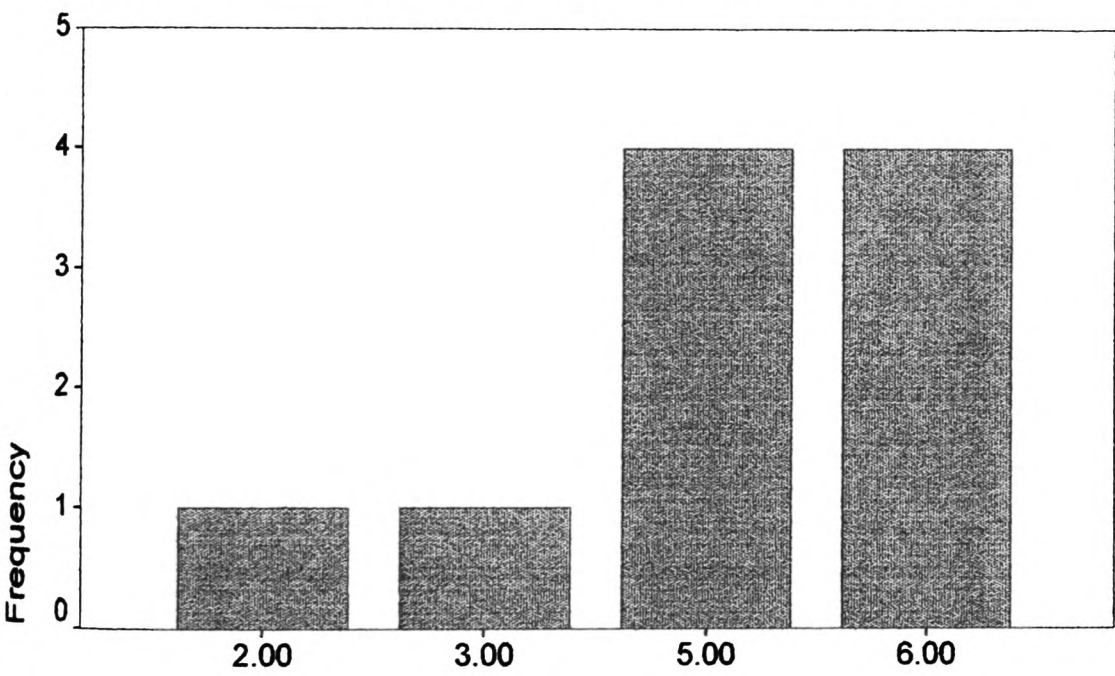
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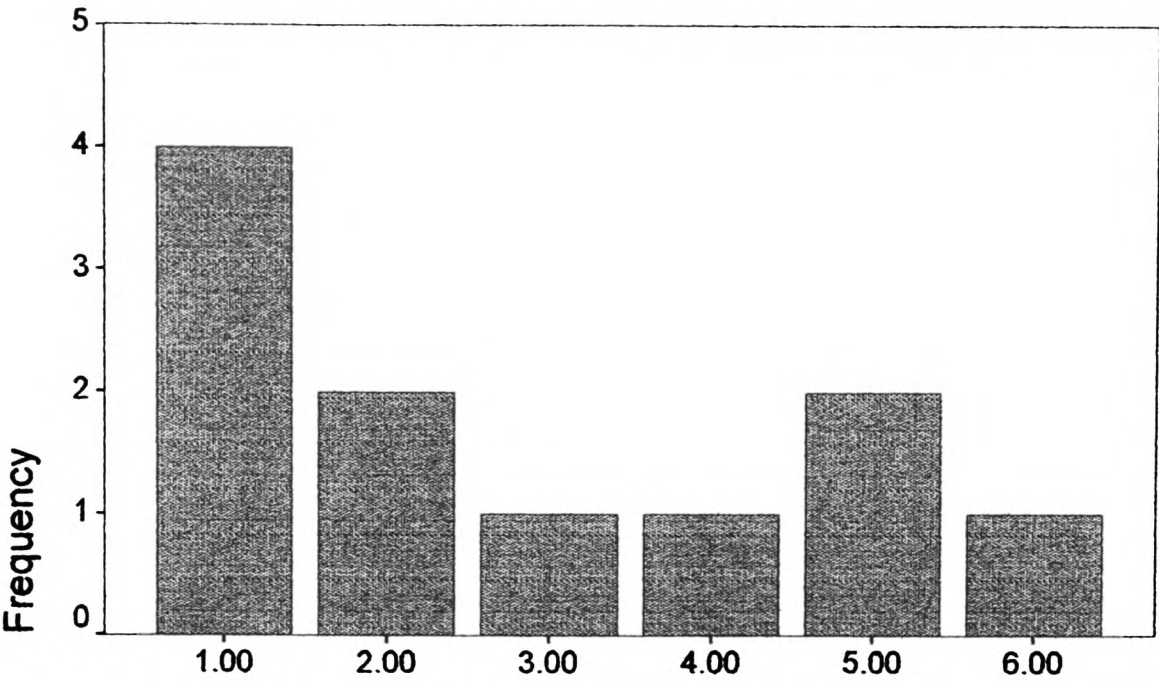
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q18

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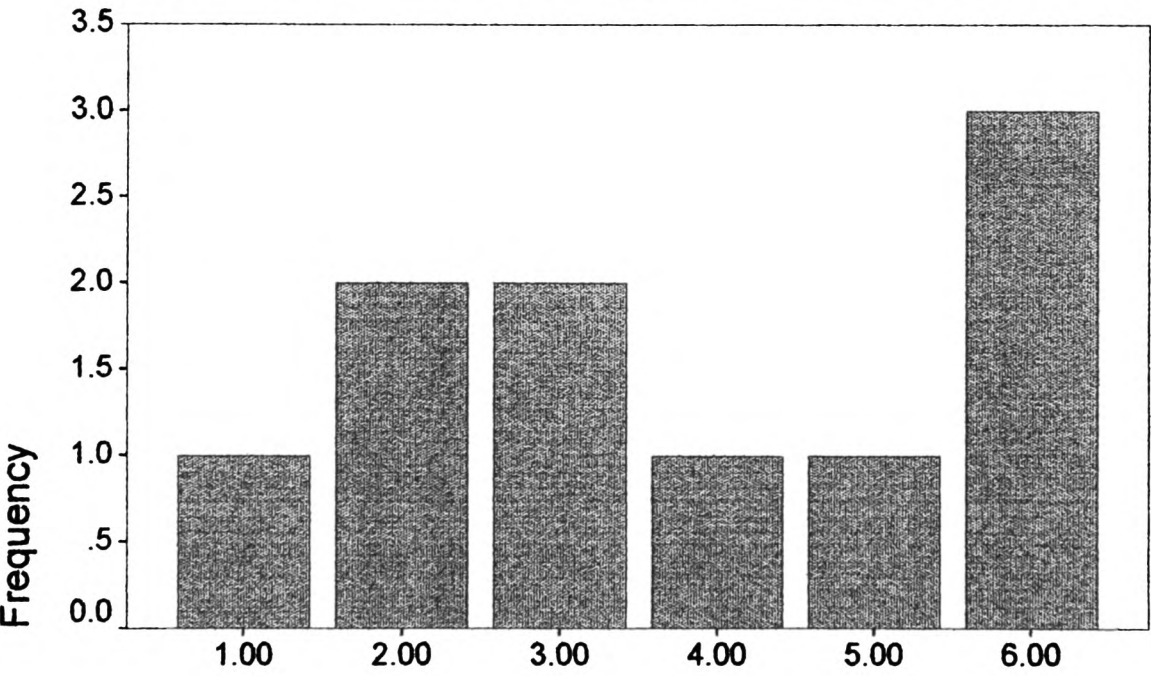
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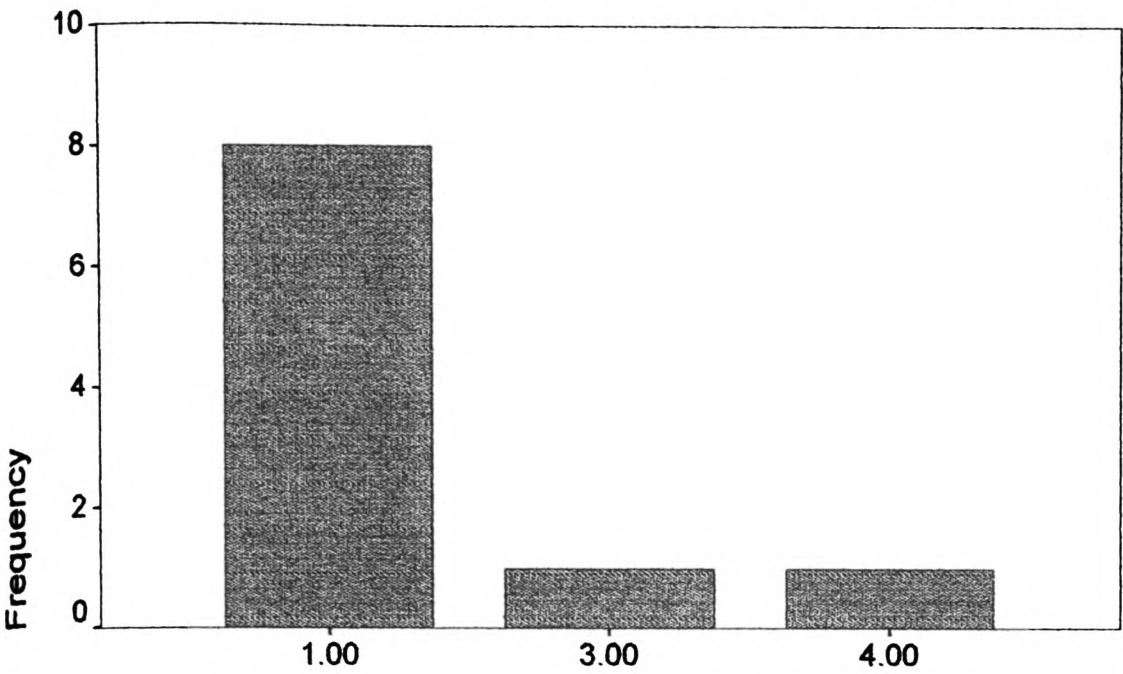
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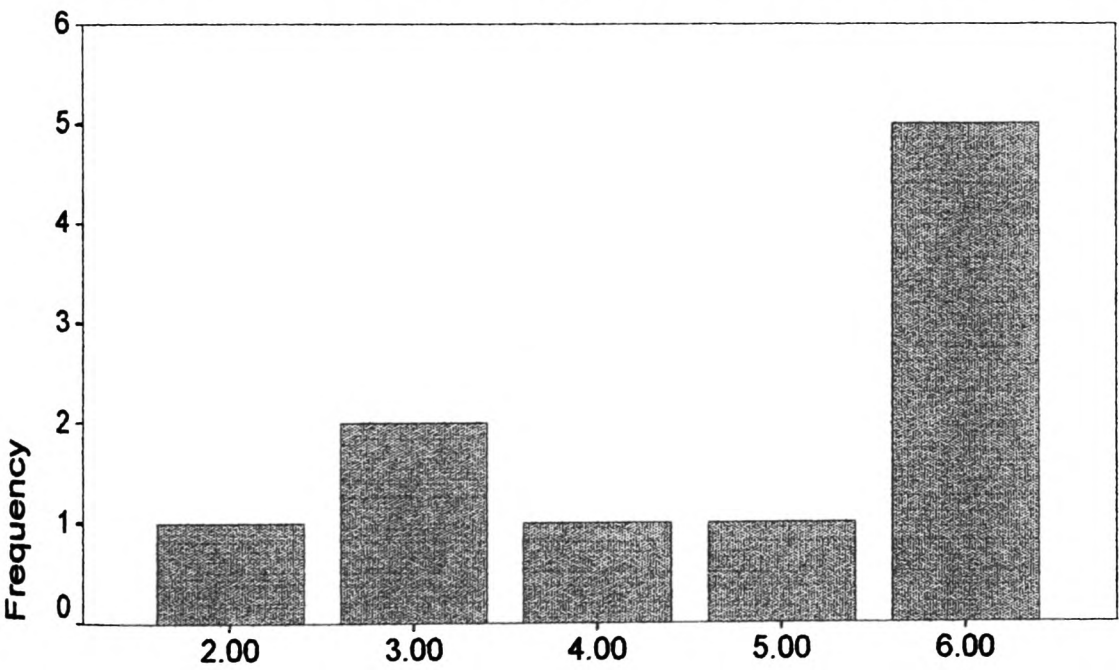
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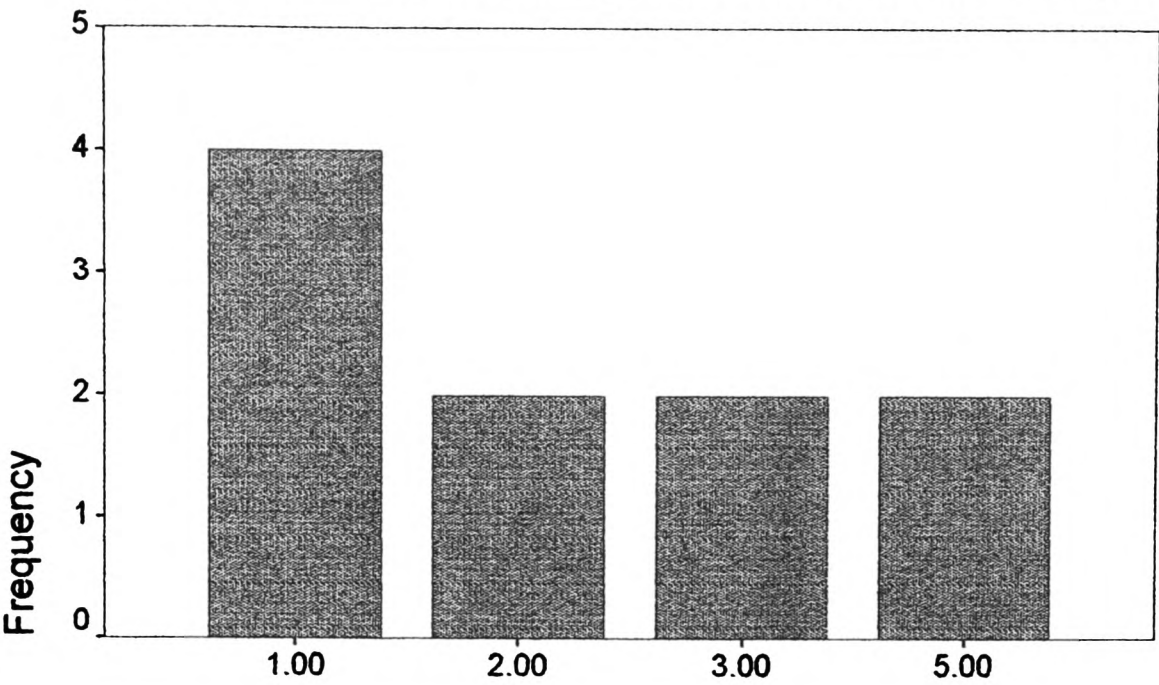
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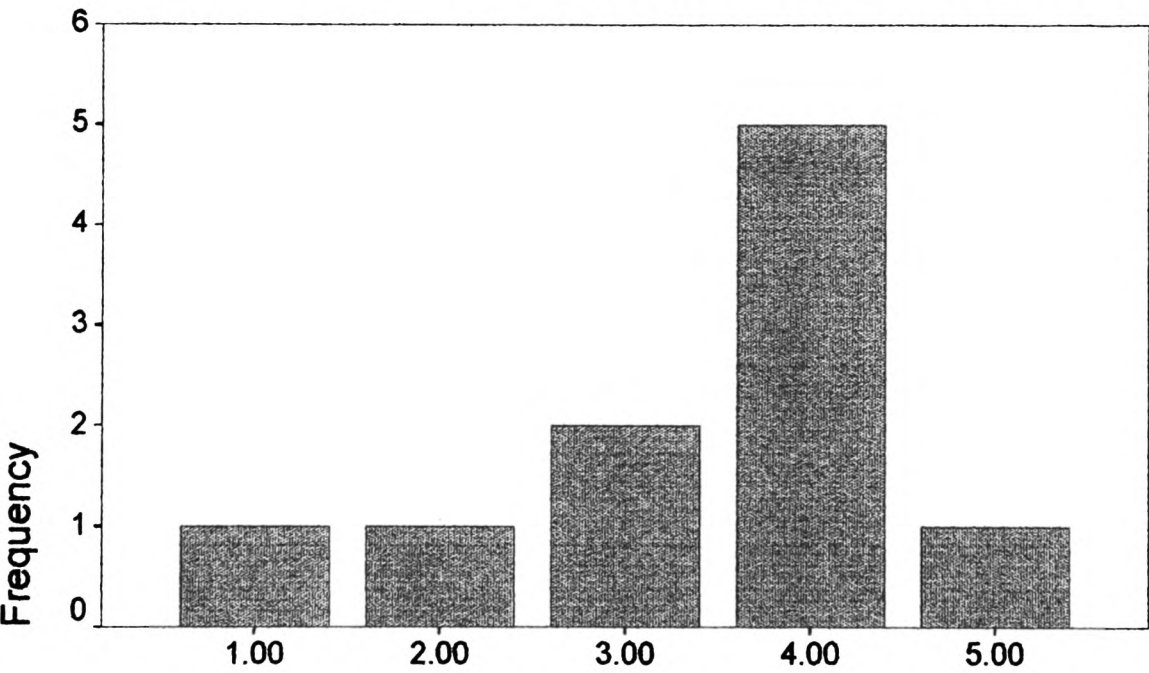
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q23

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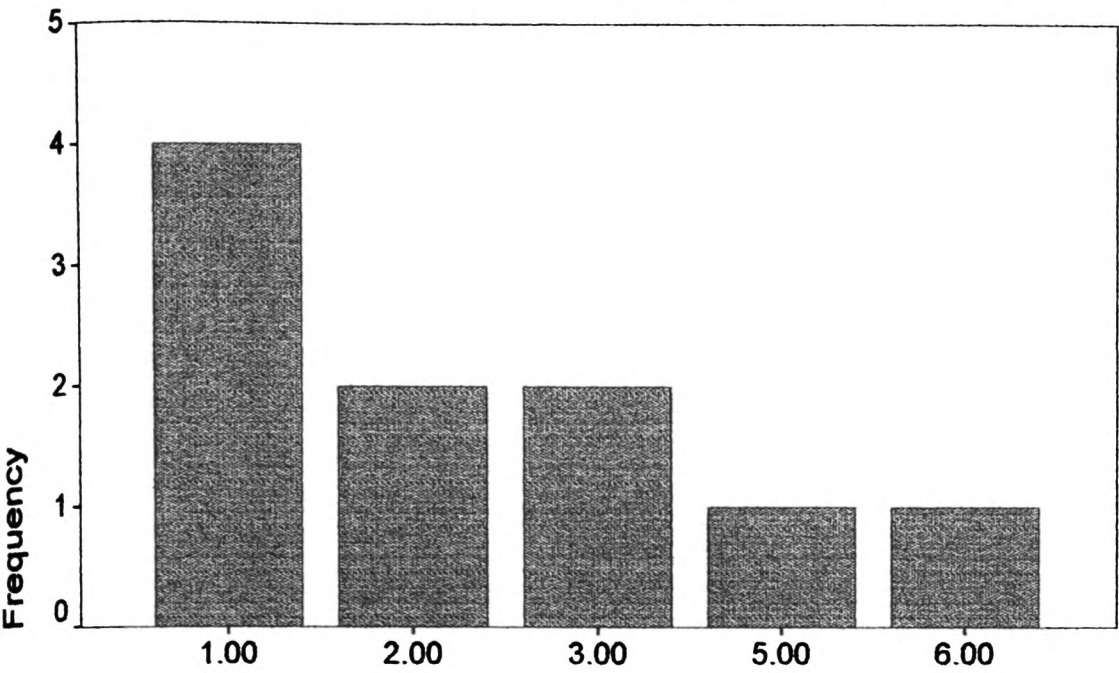
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q24

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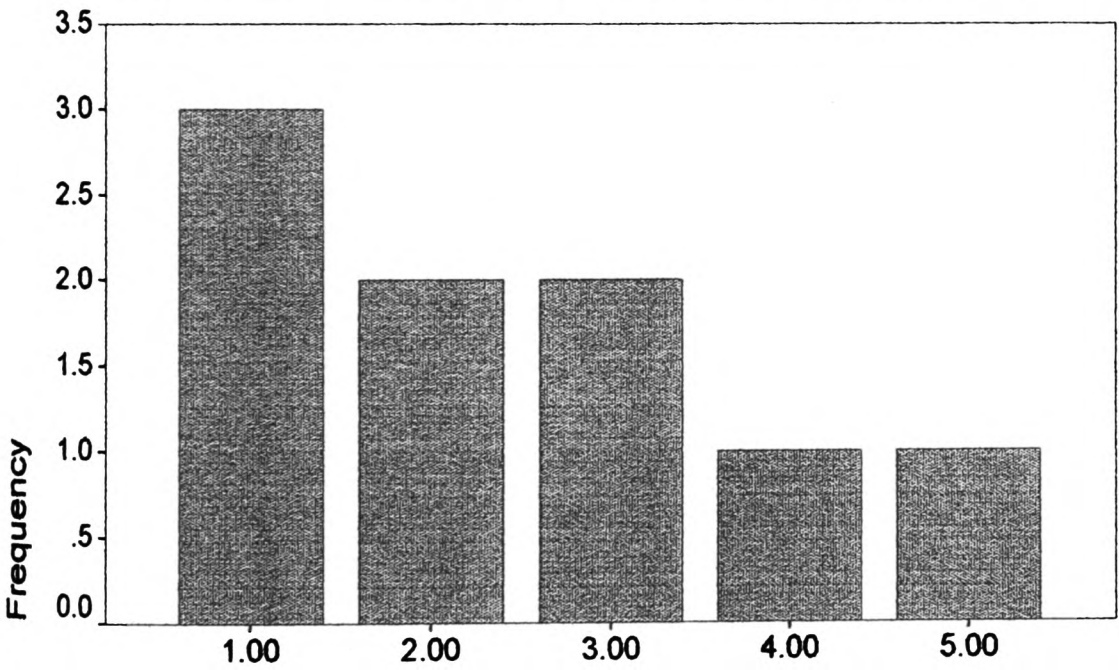
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q25

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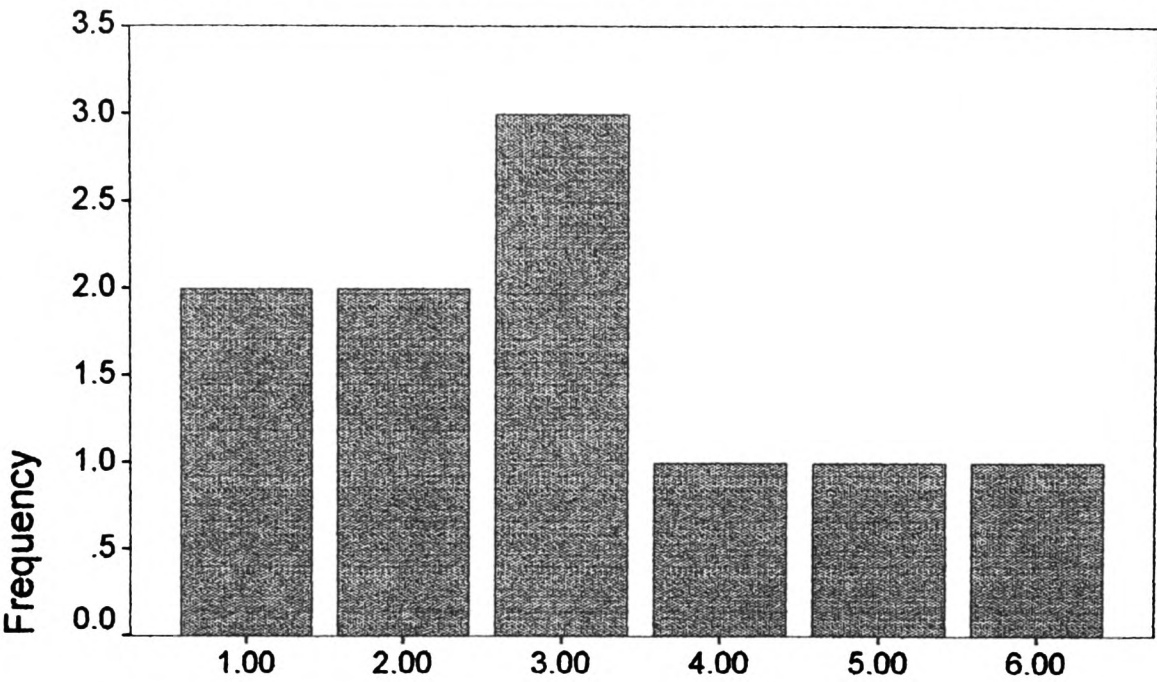
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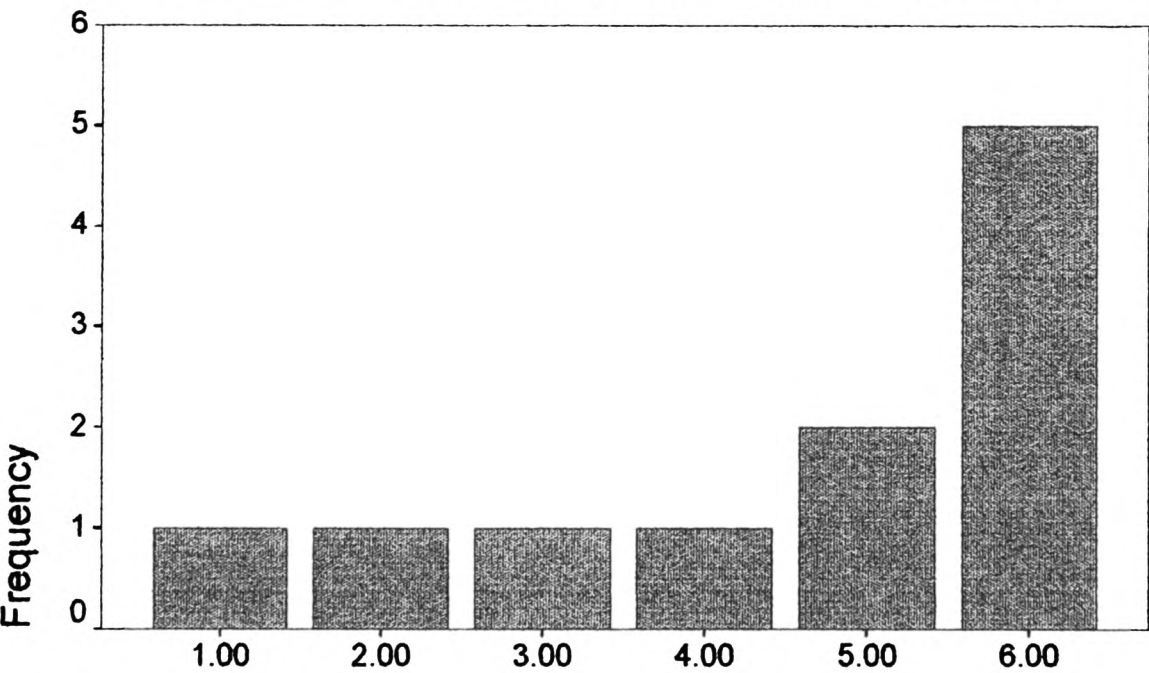
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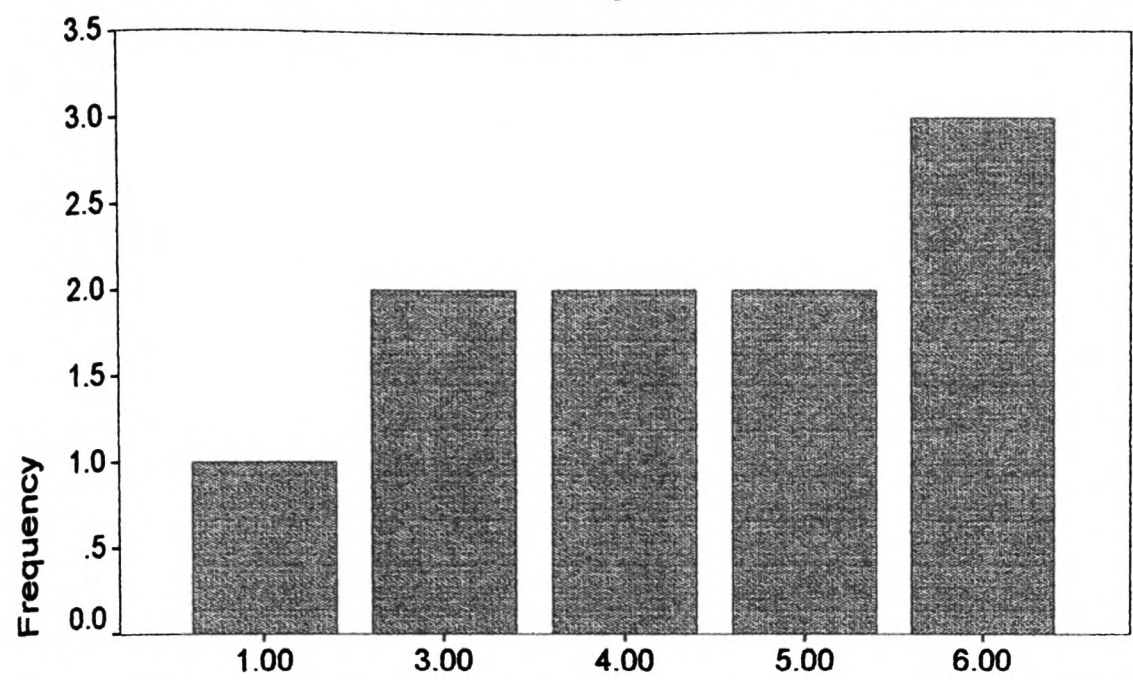
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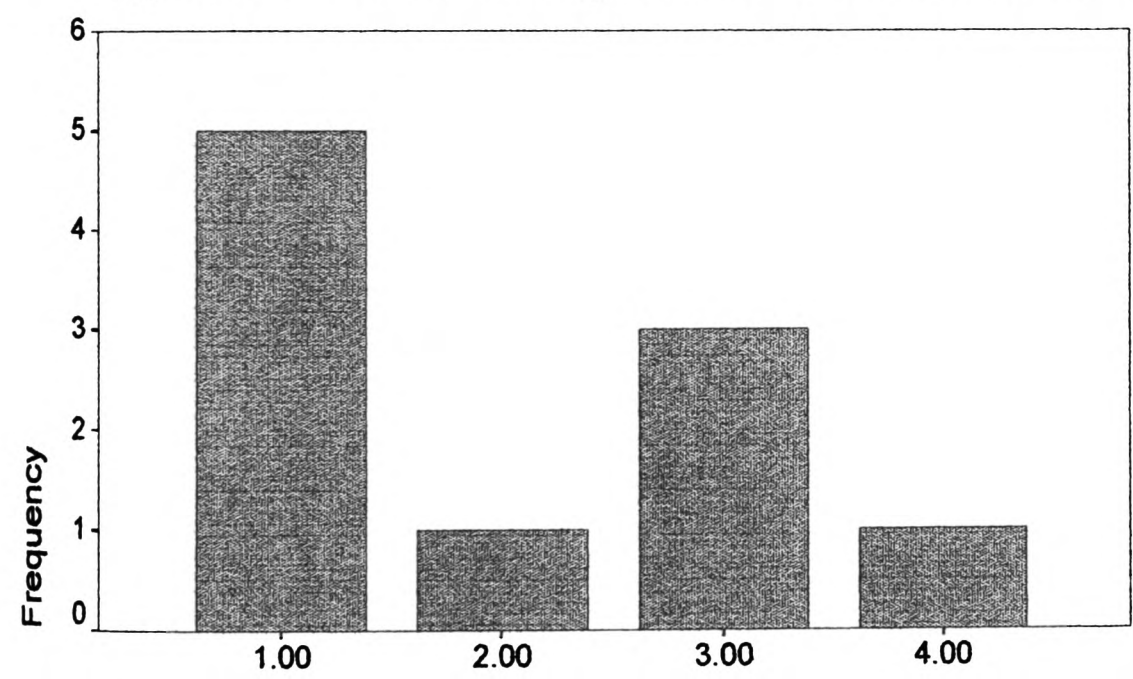
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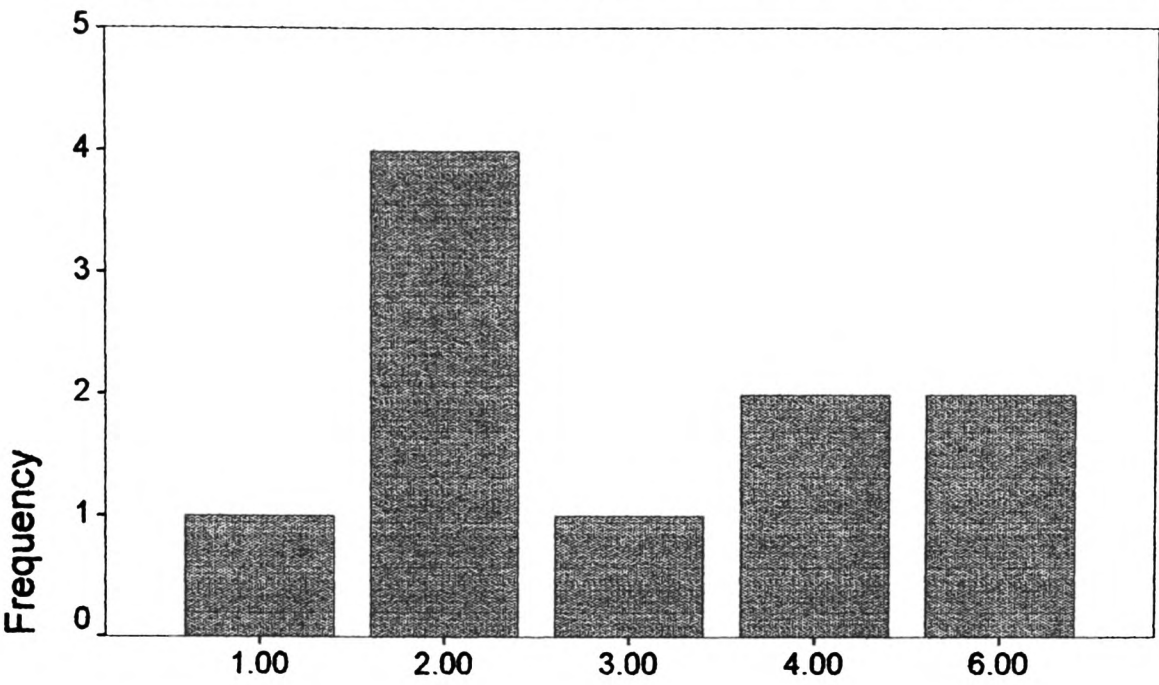
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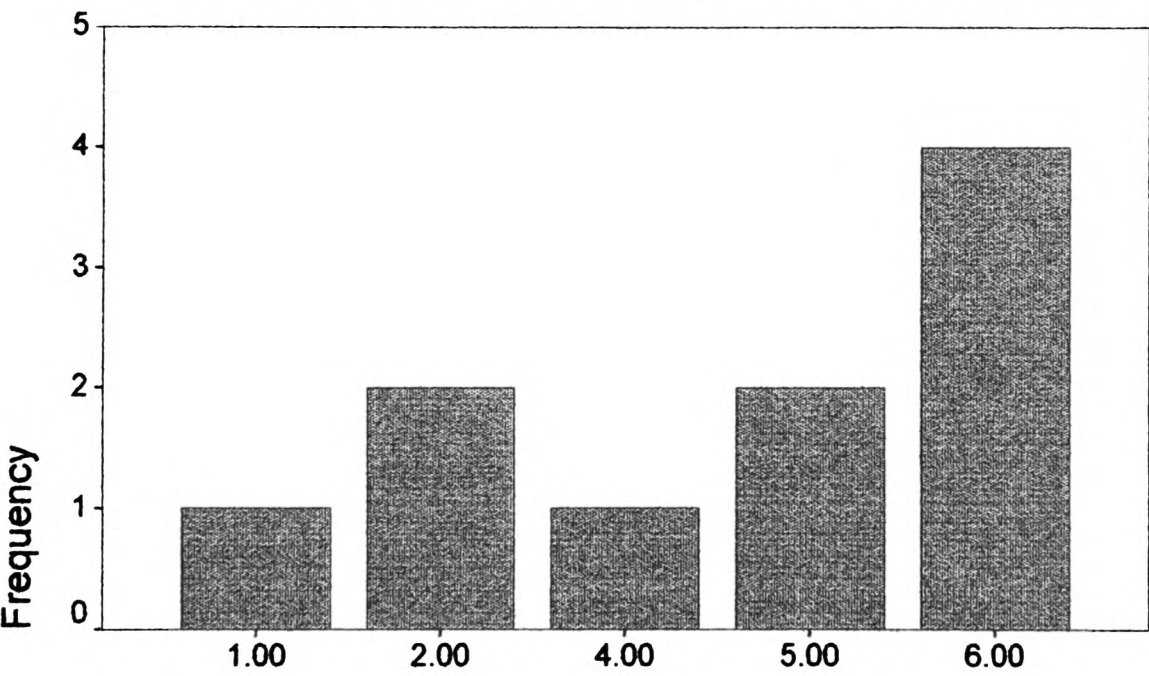
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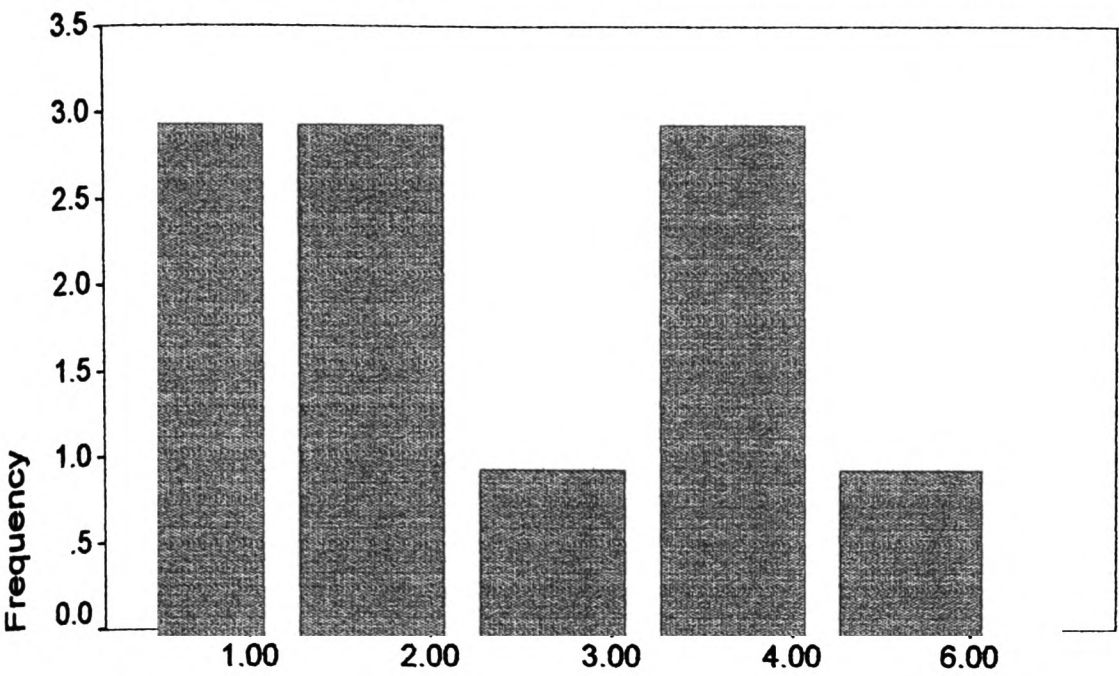
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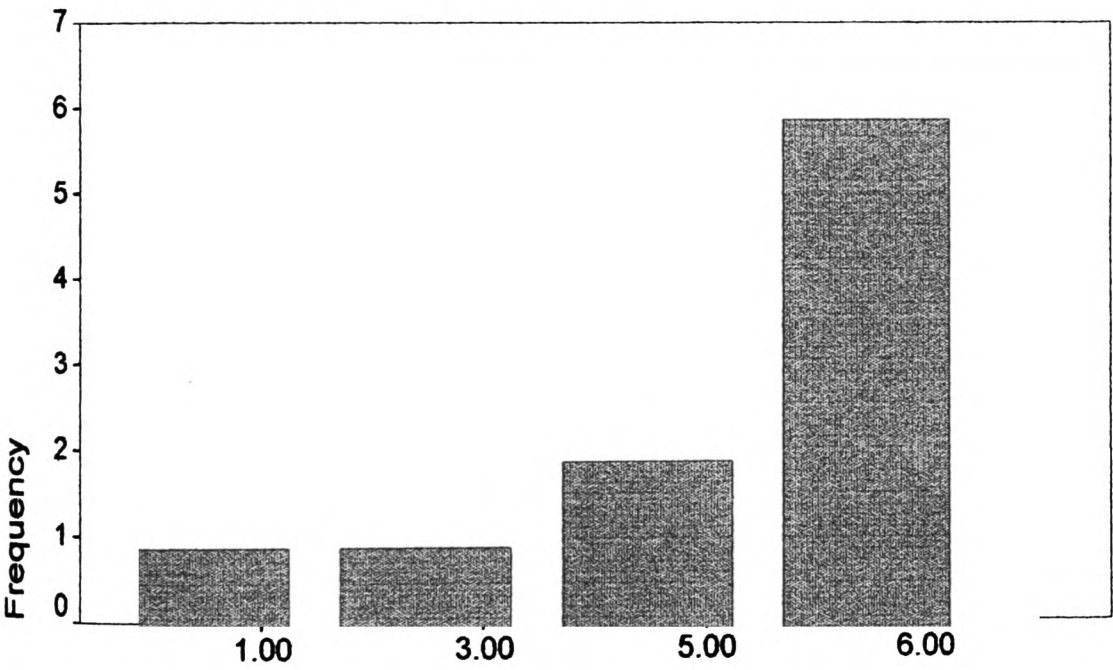
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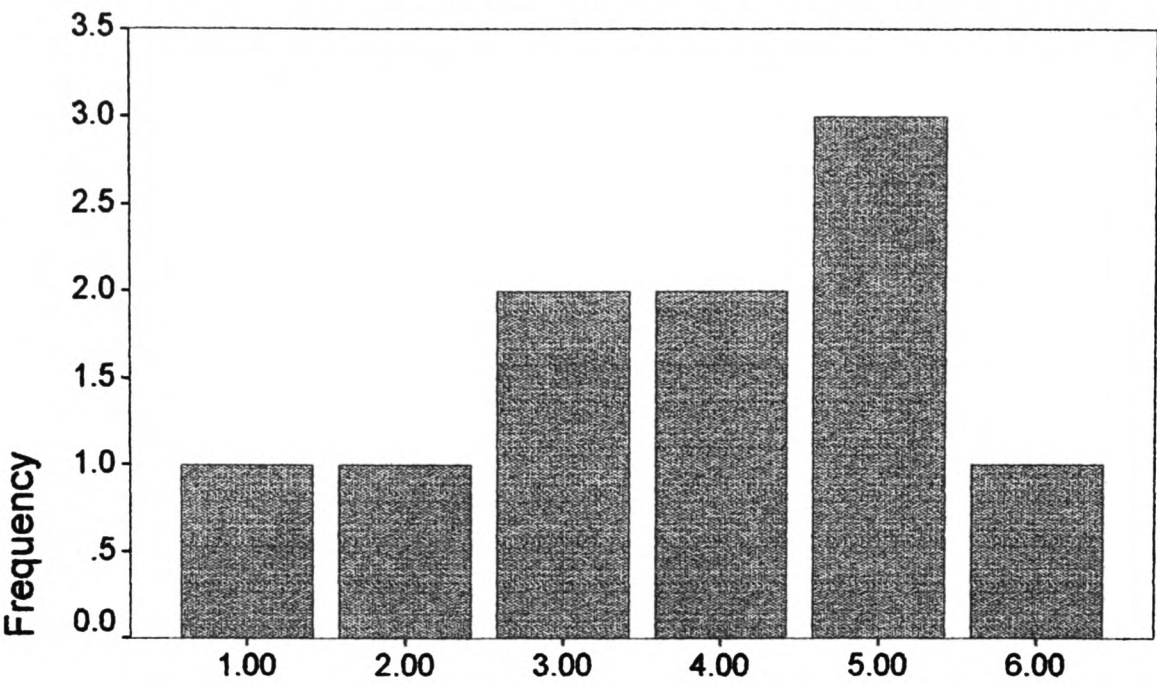
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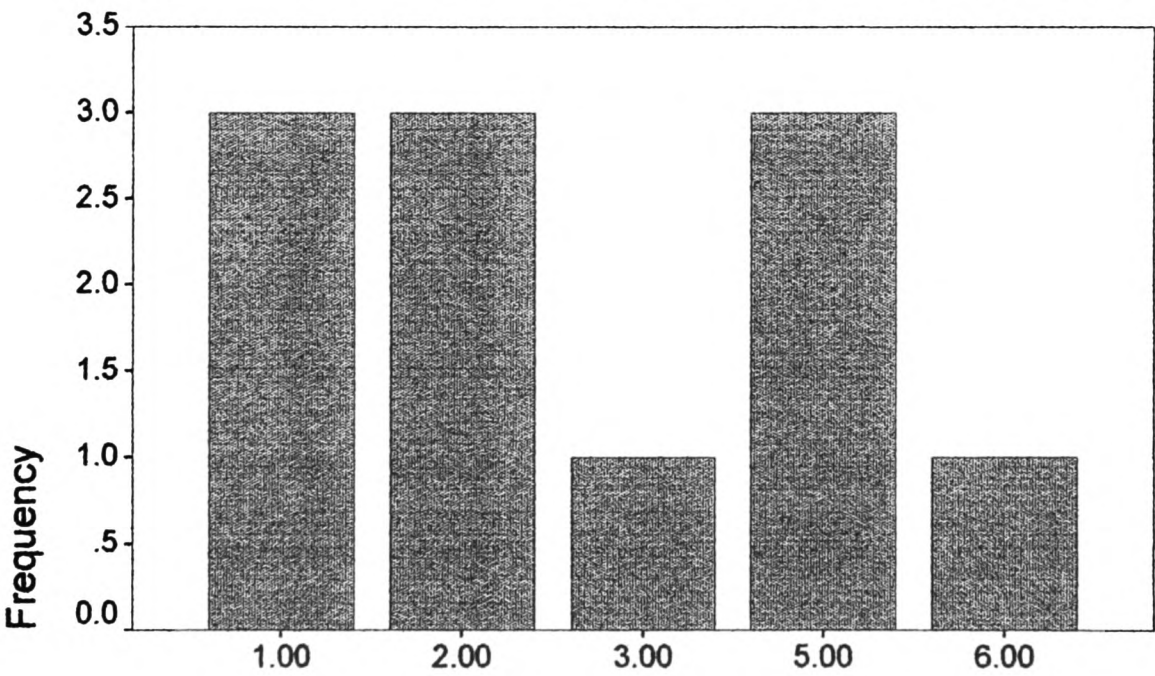
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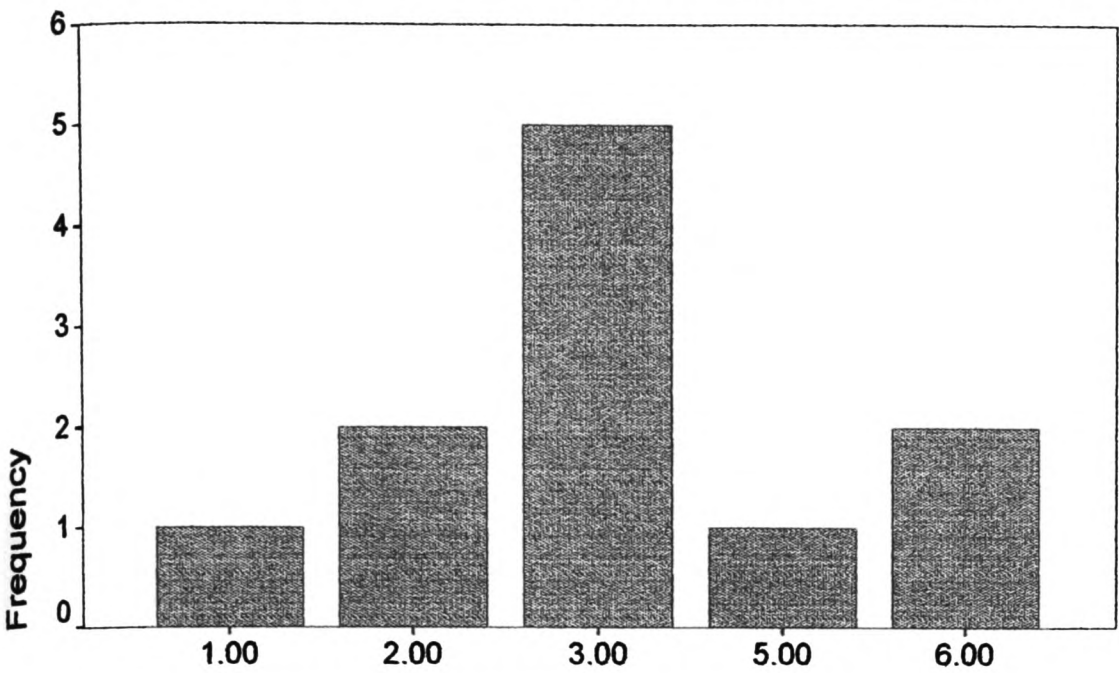
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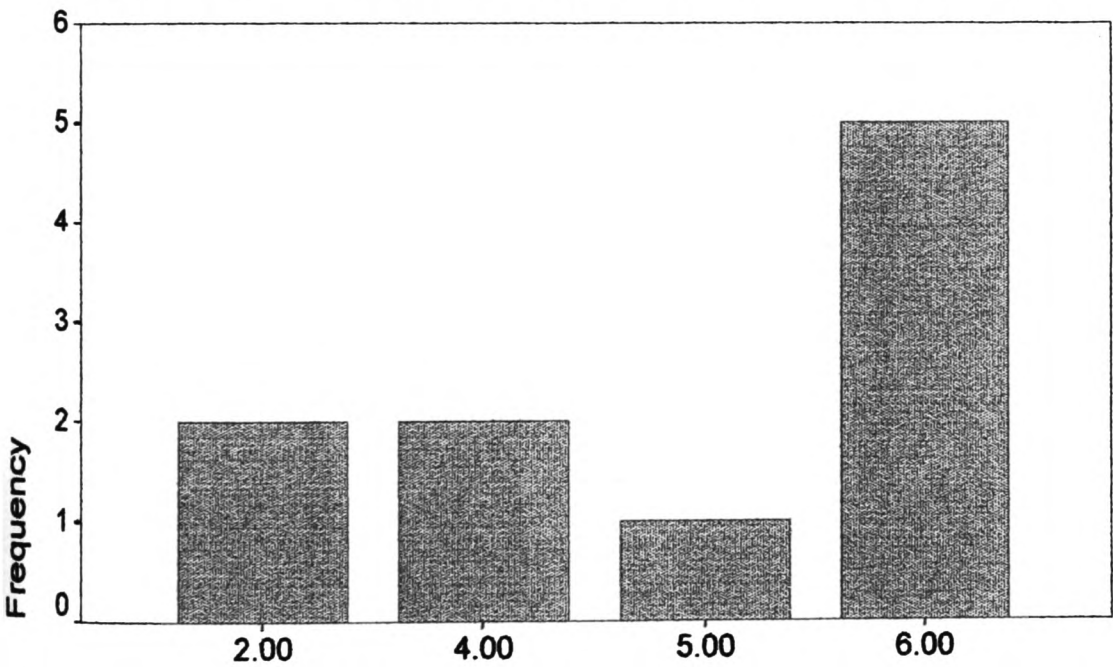
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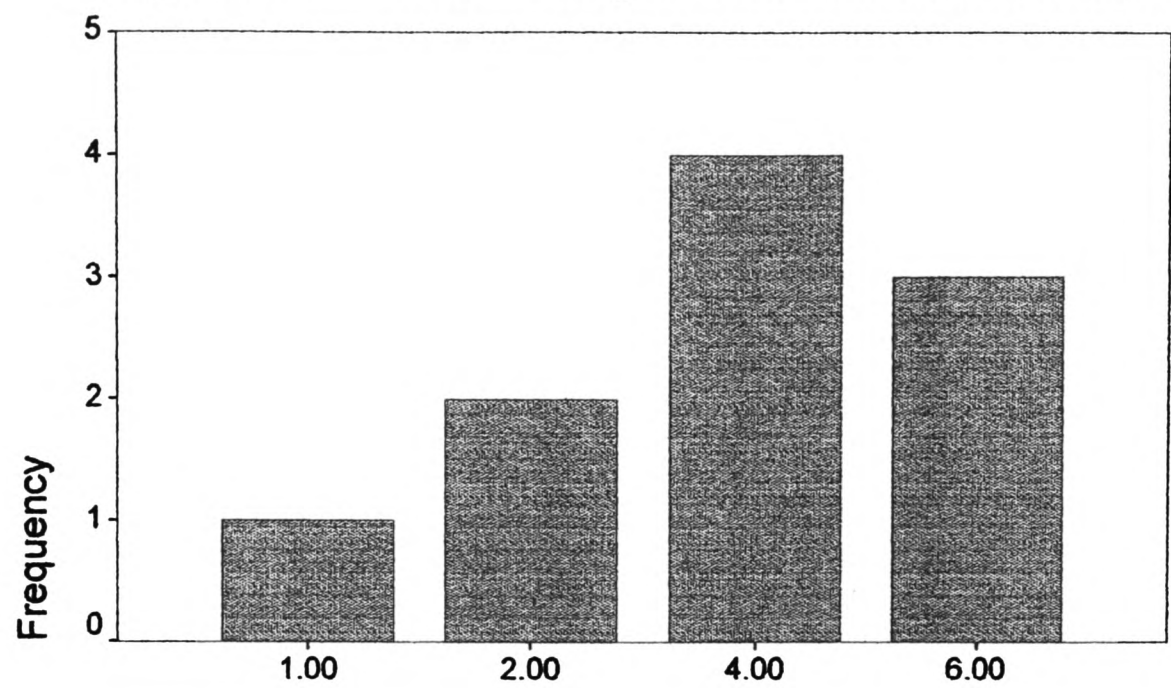
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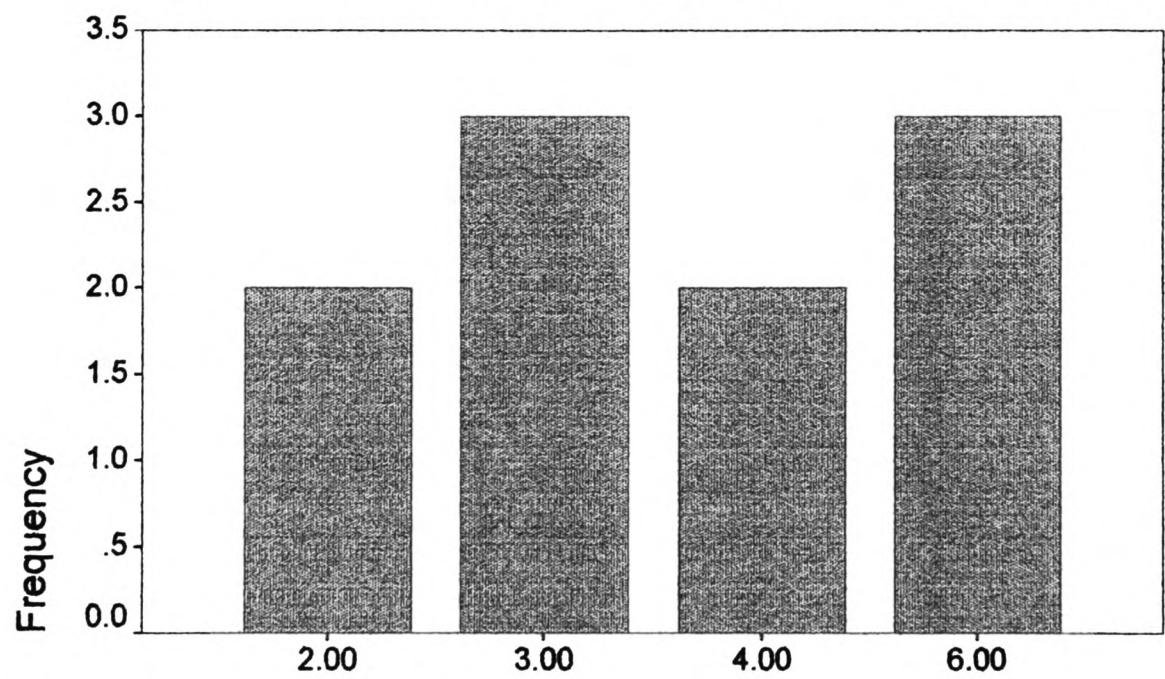
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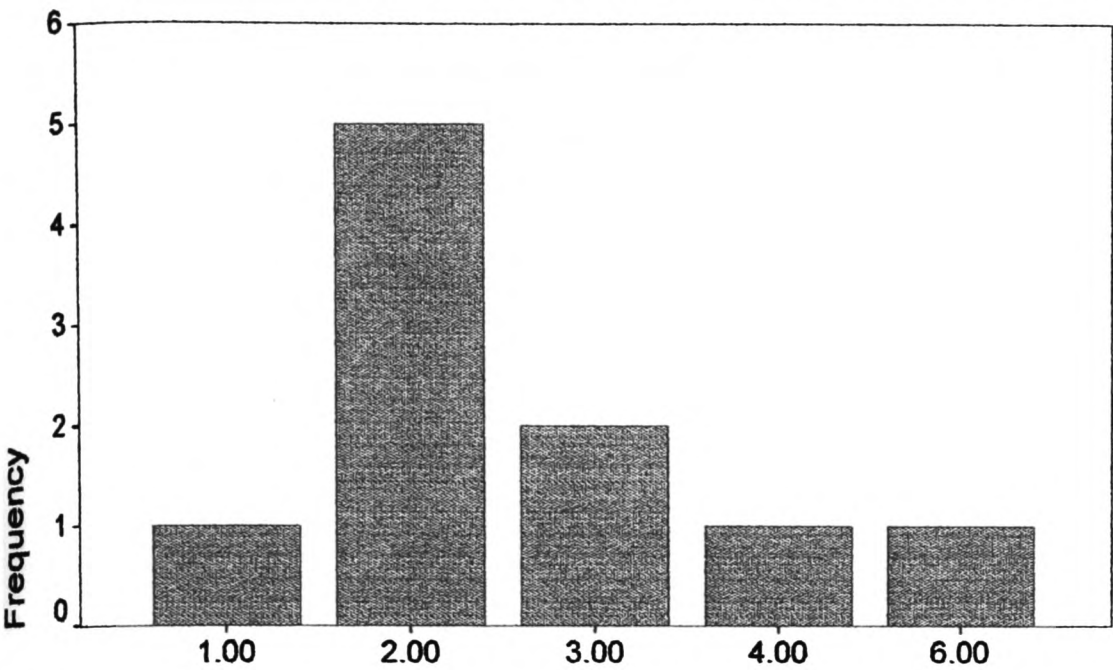
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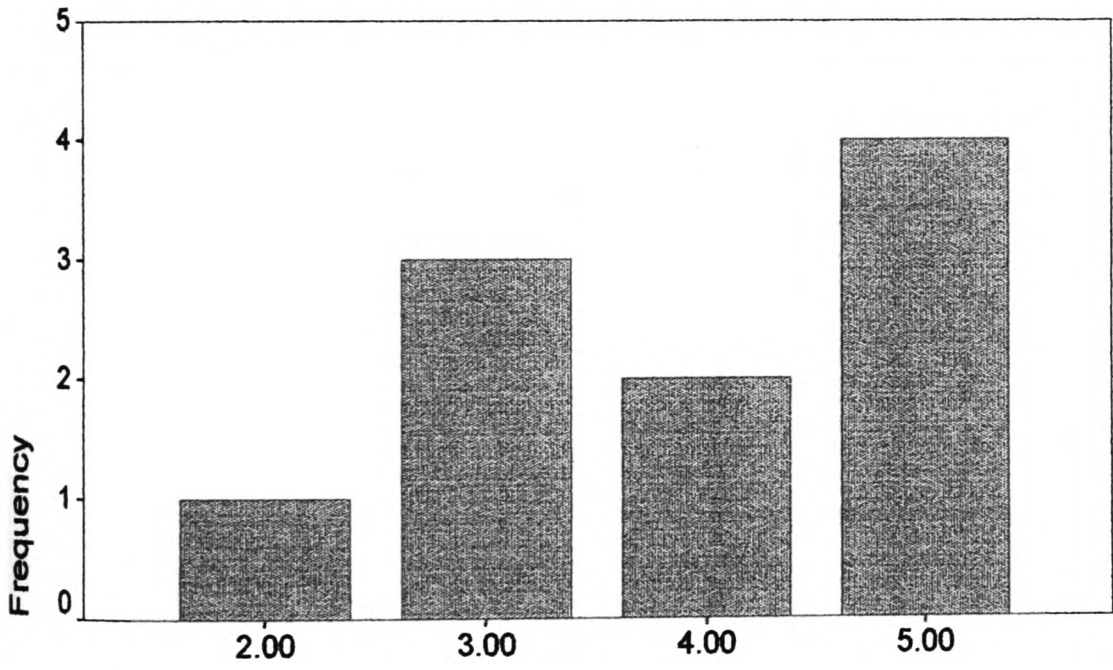
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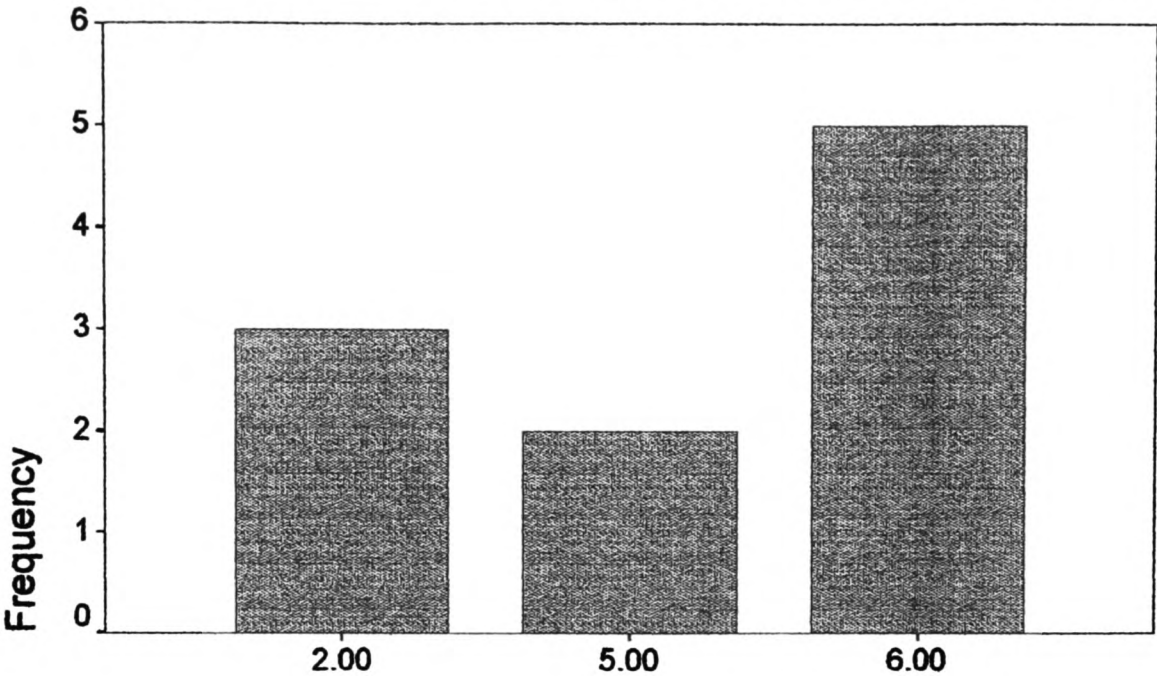
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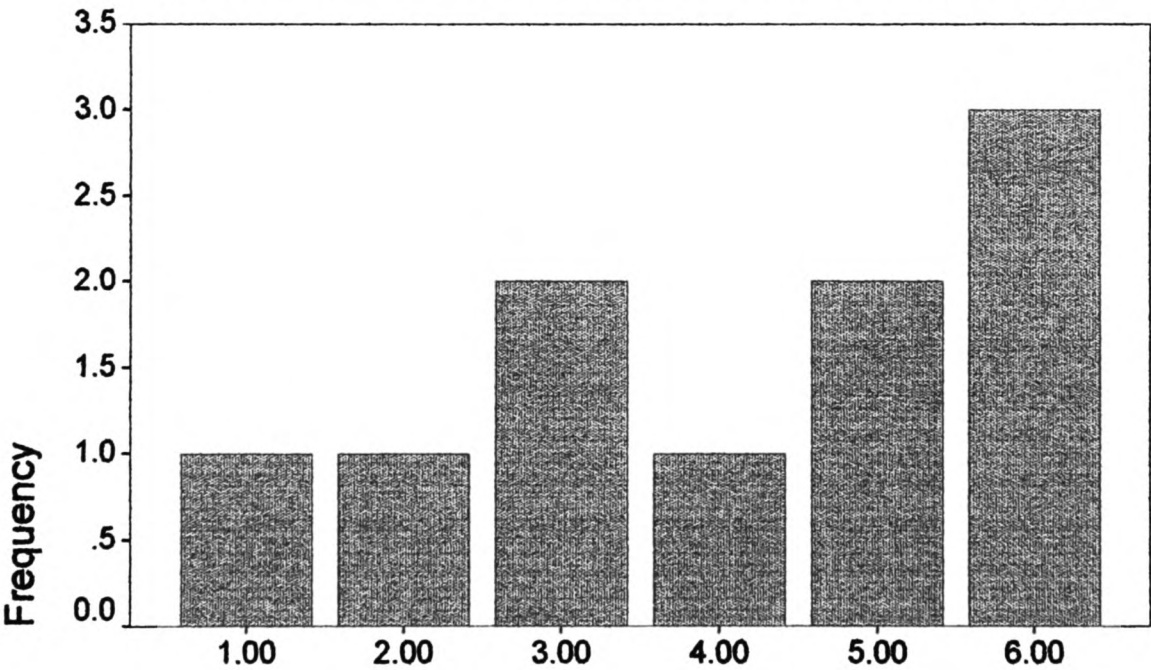
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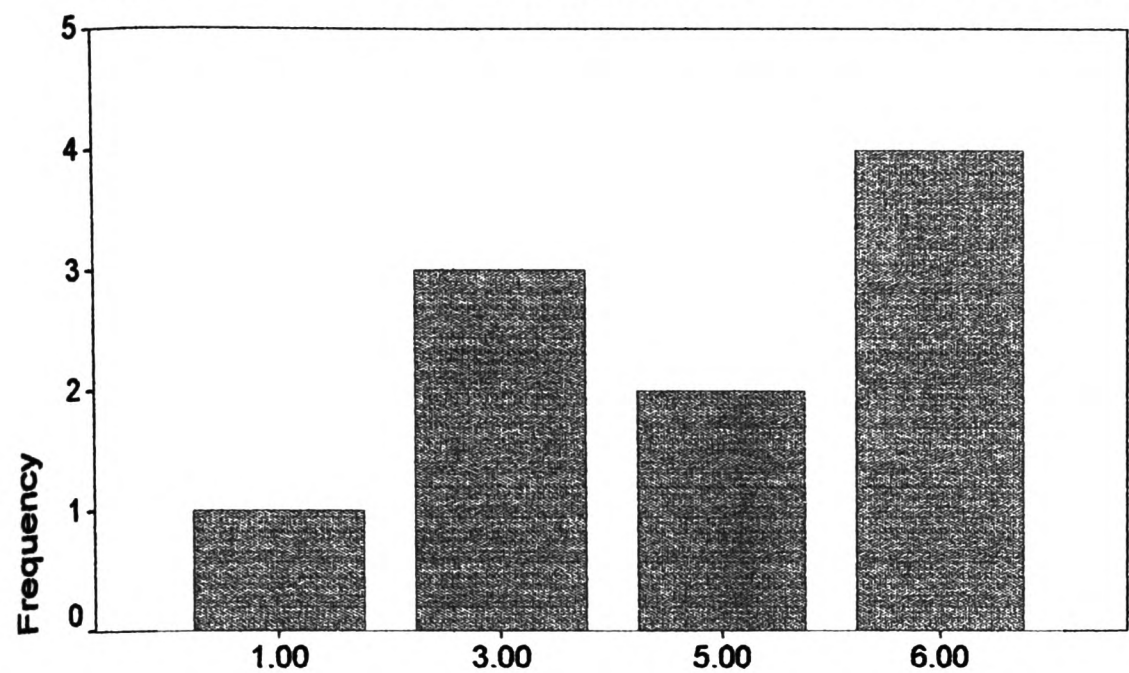
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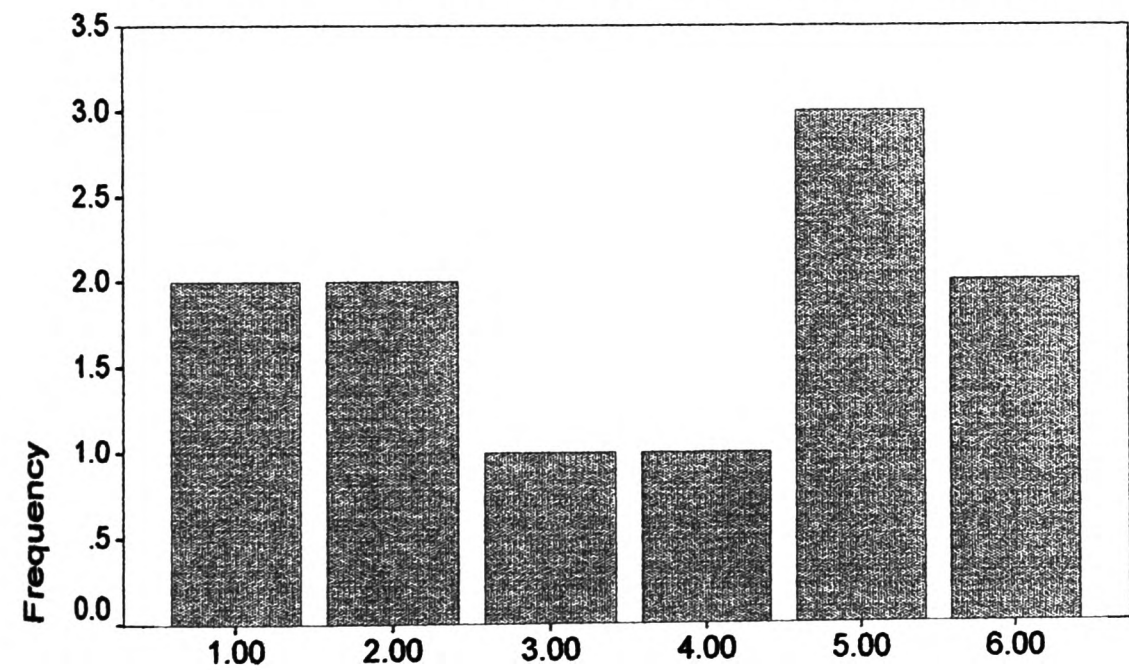
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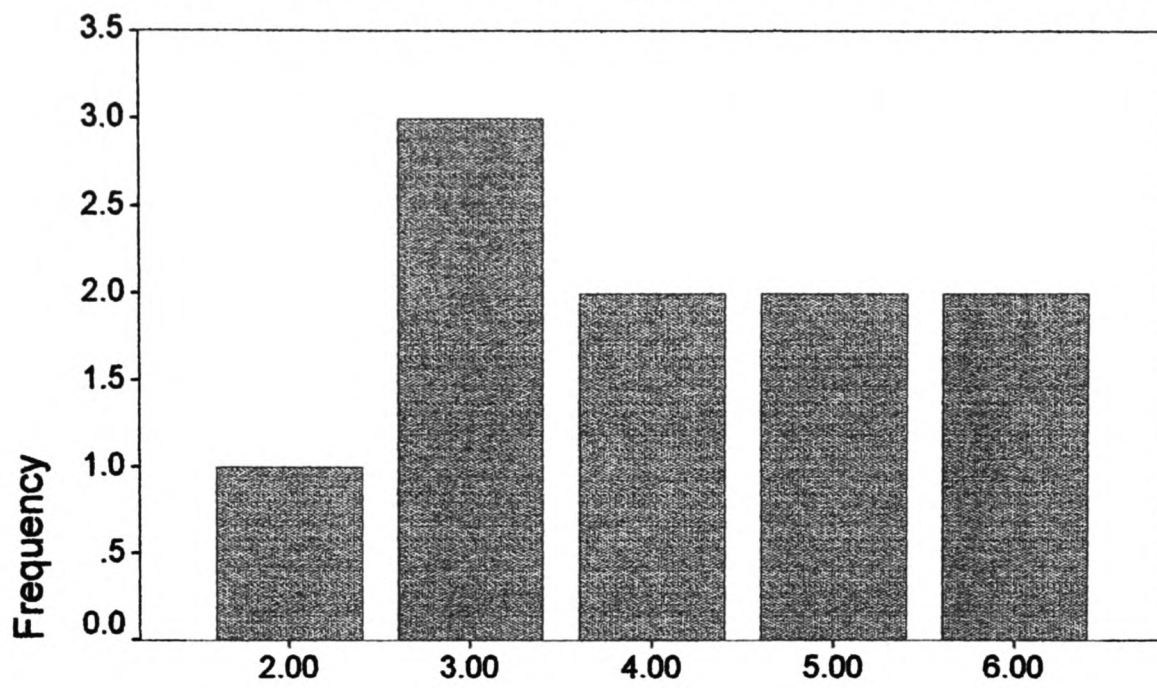
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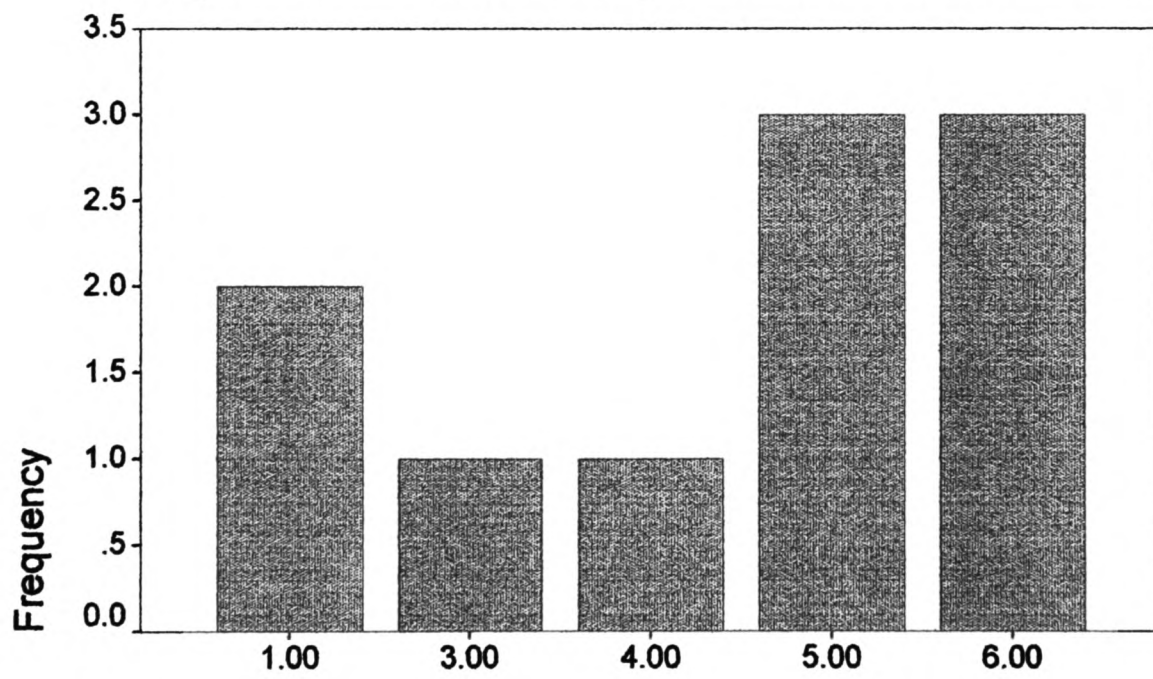
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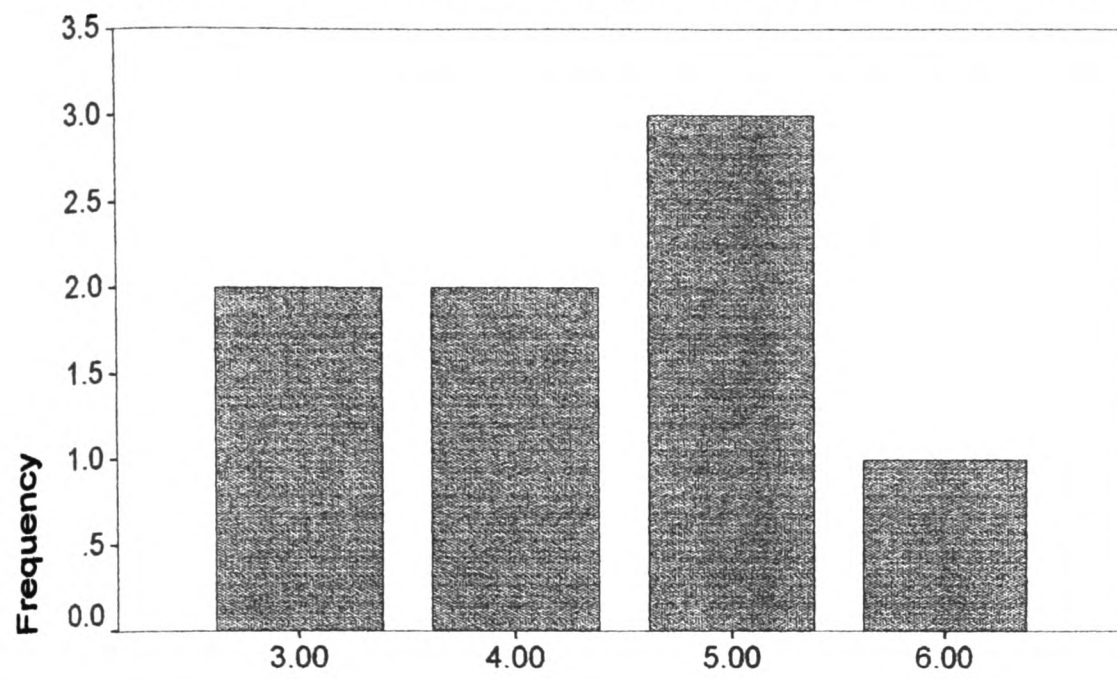
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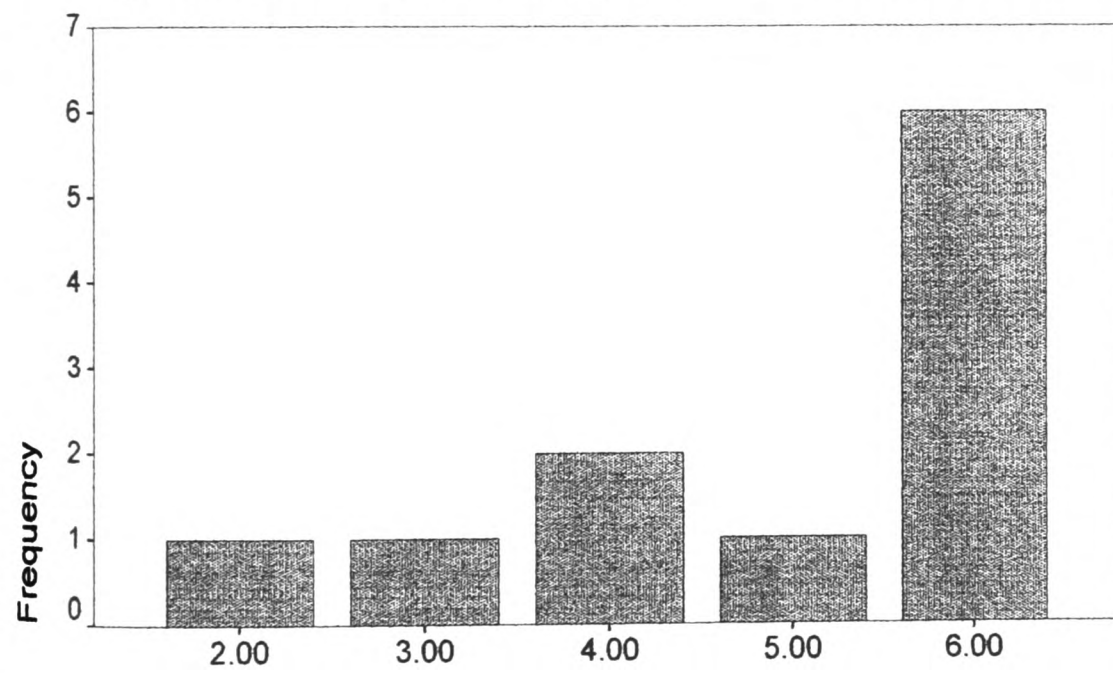
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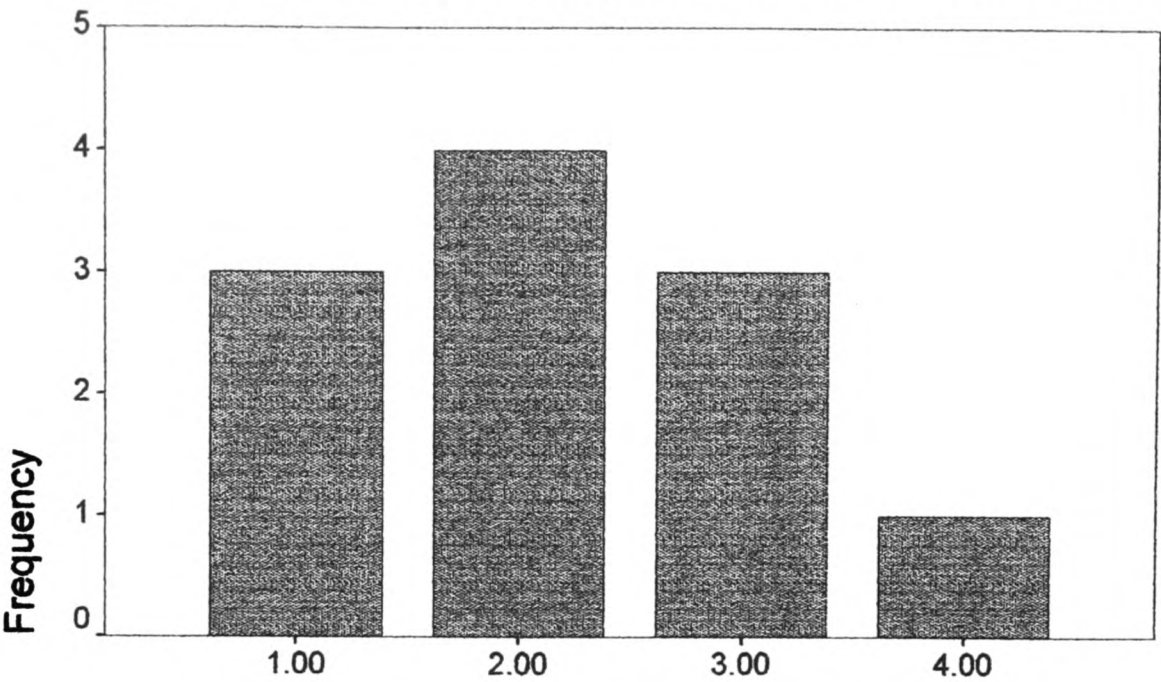
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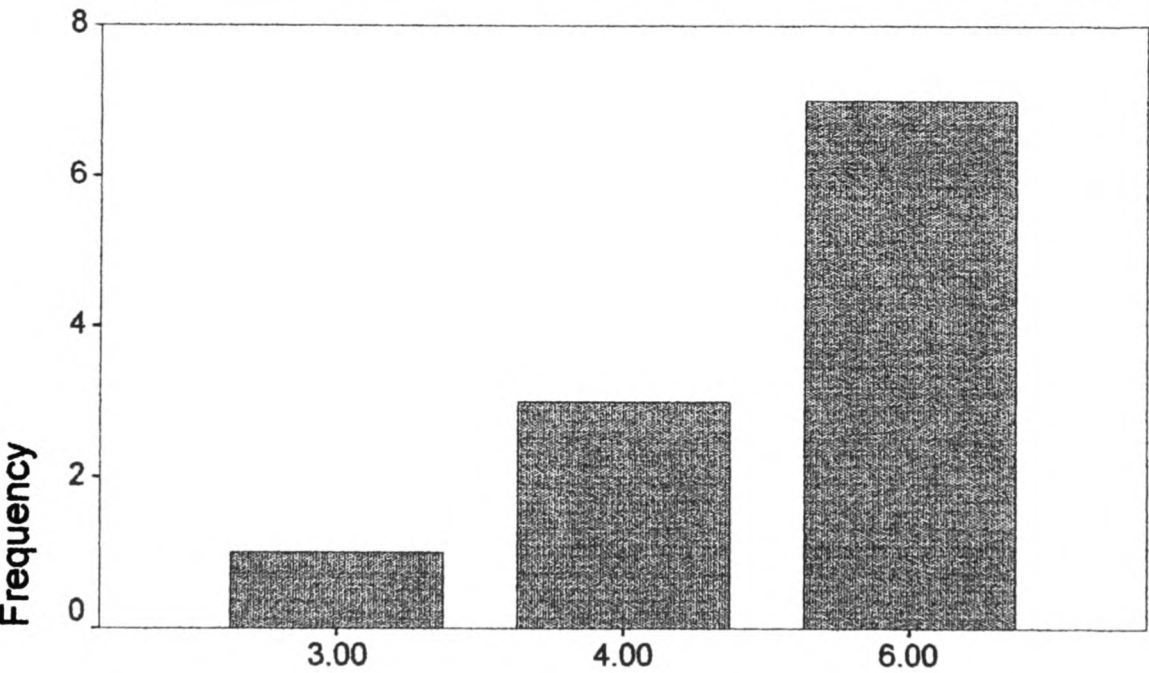
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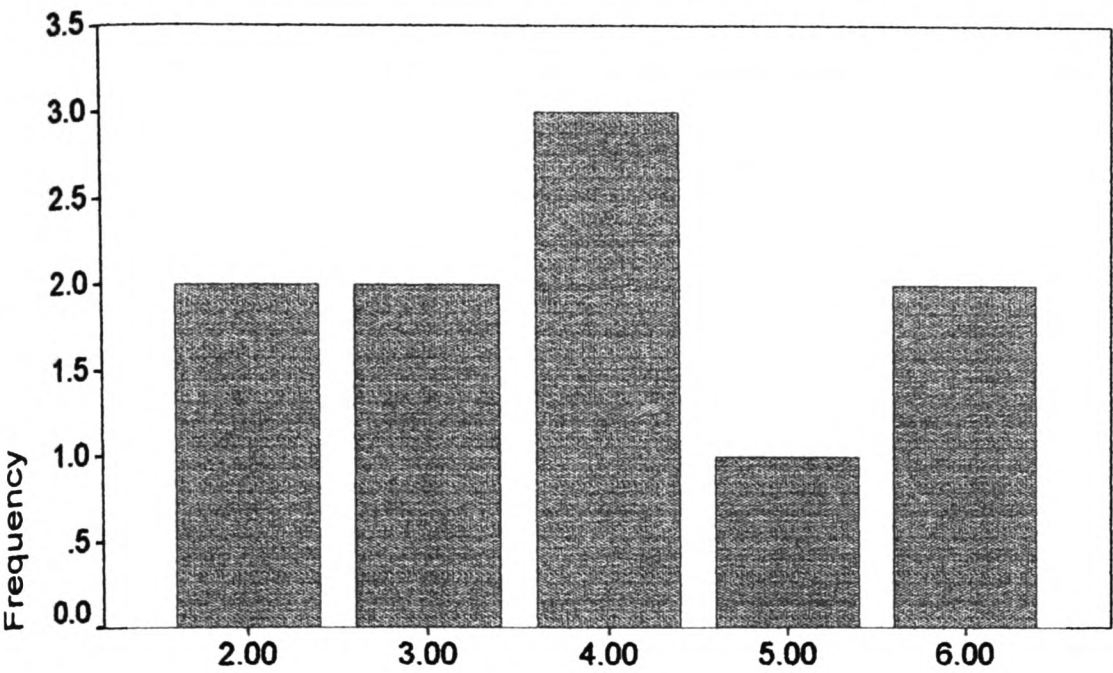
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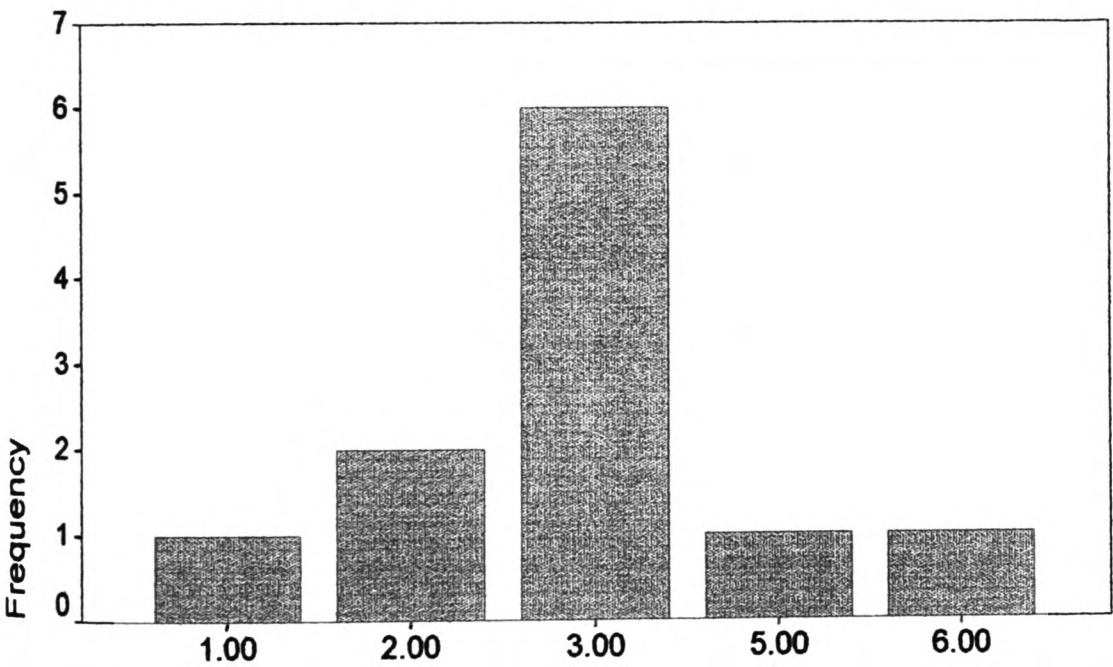
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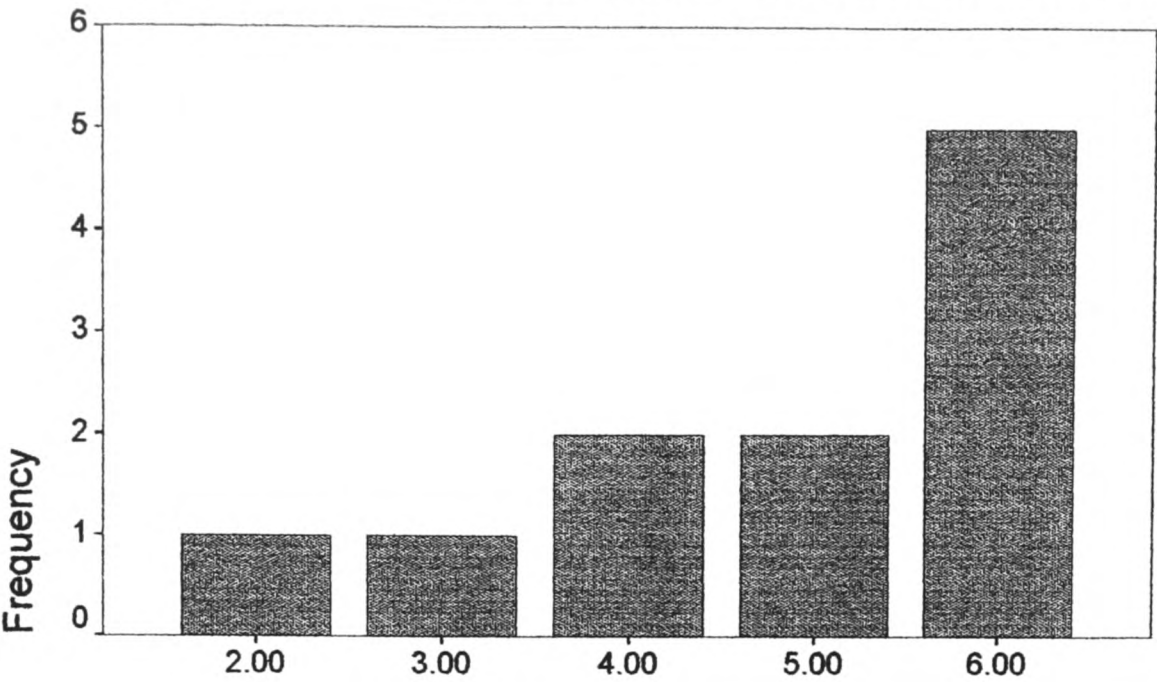
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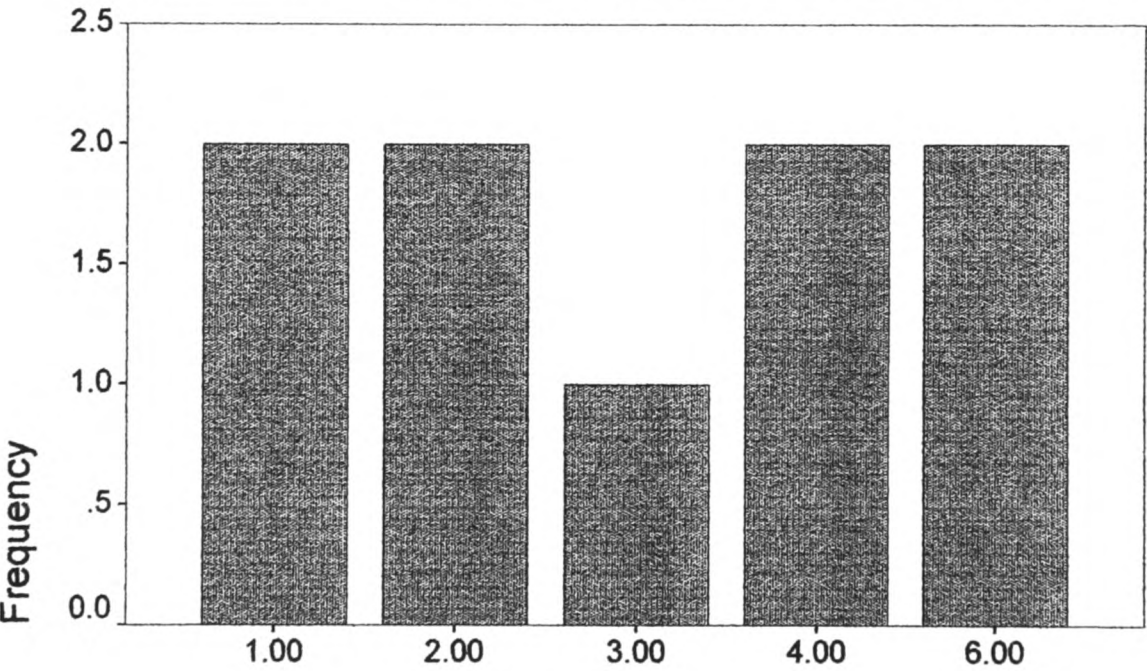
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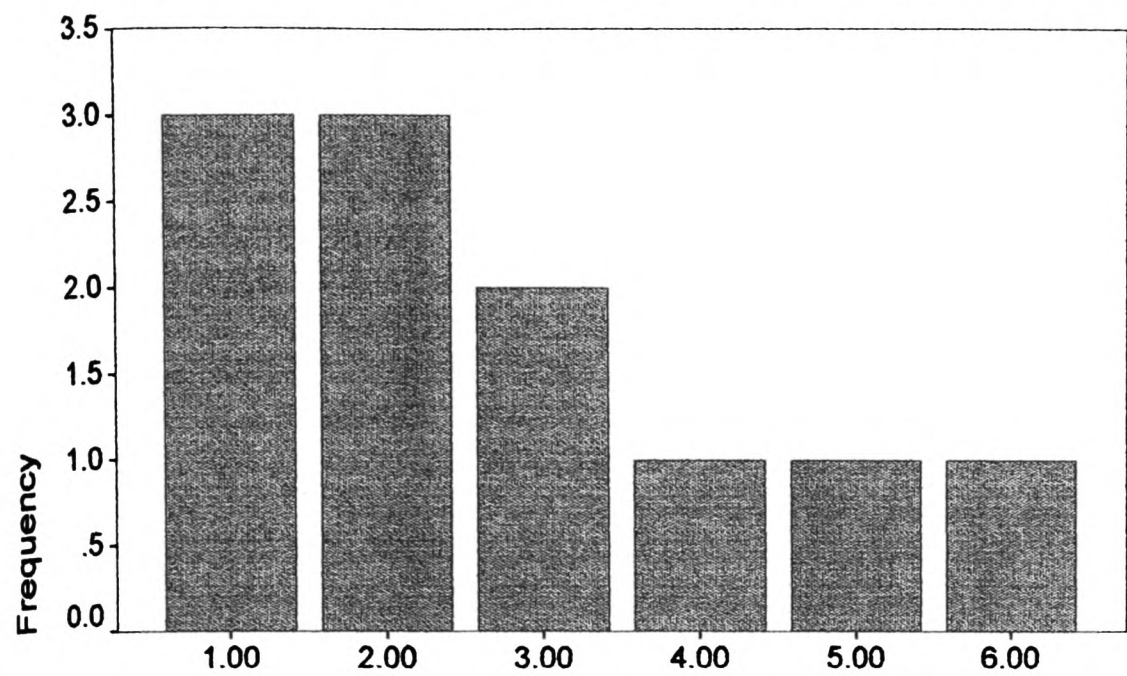
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q56

q57

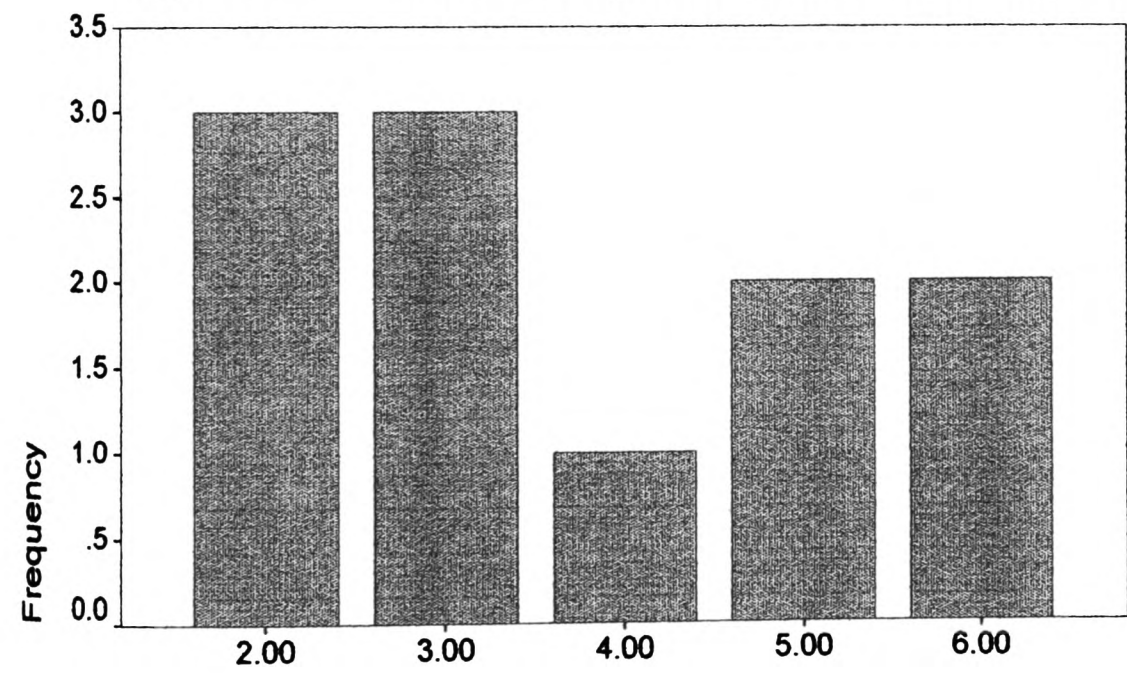
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q57

q58

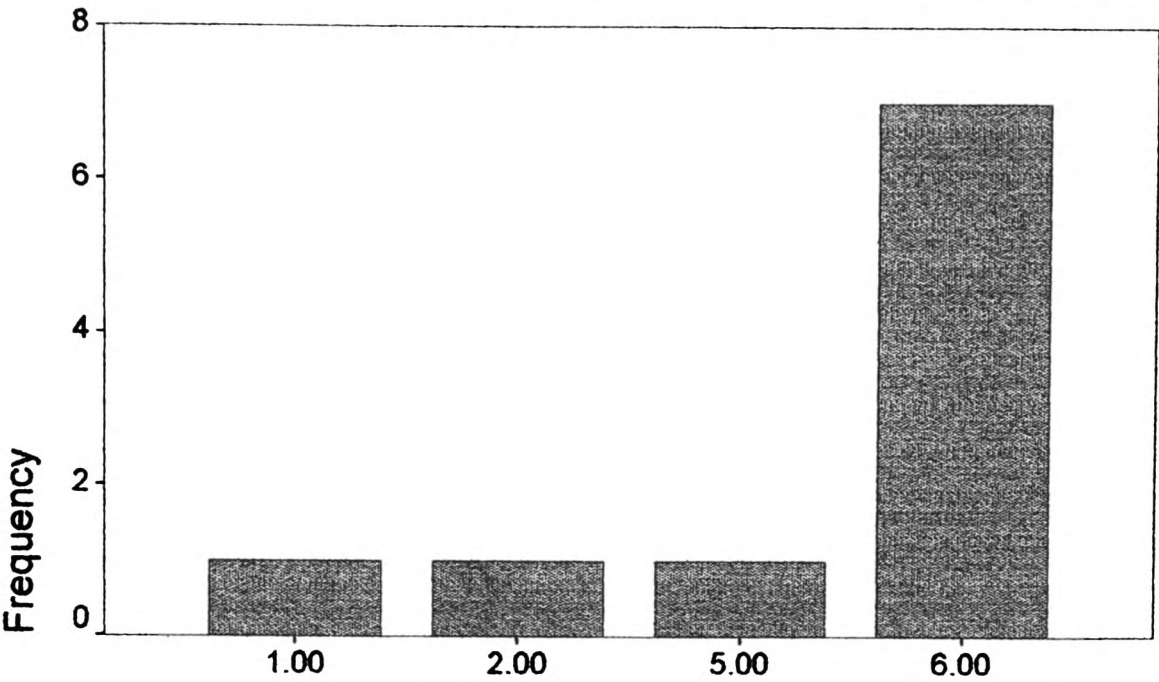
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q58

q59

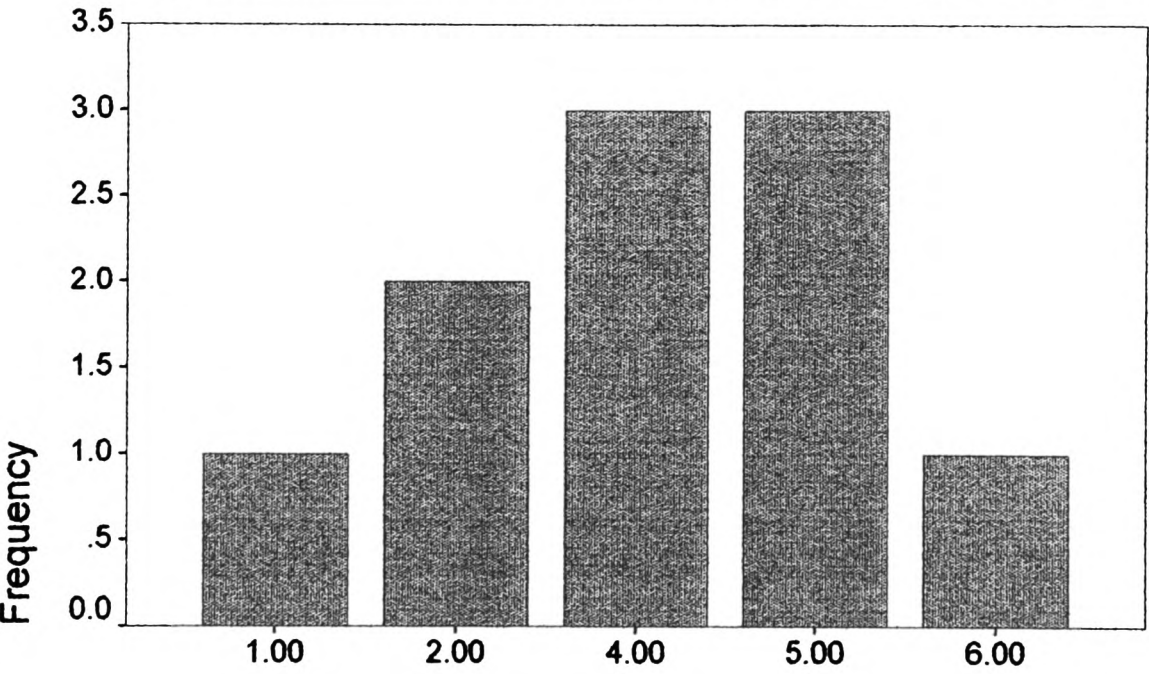
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q59

q60

Q_TYPE: 2.00 Bilingual J Text/E Questionnaire

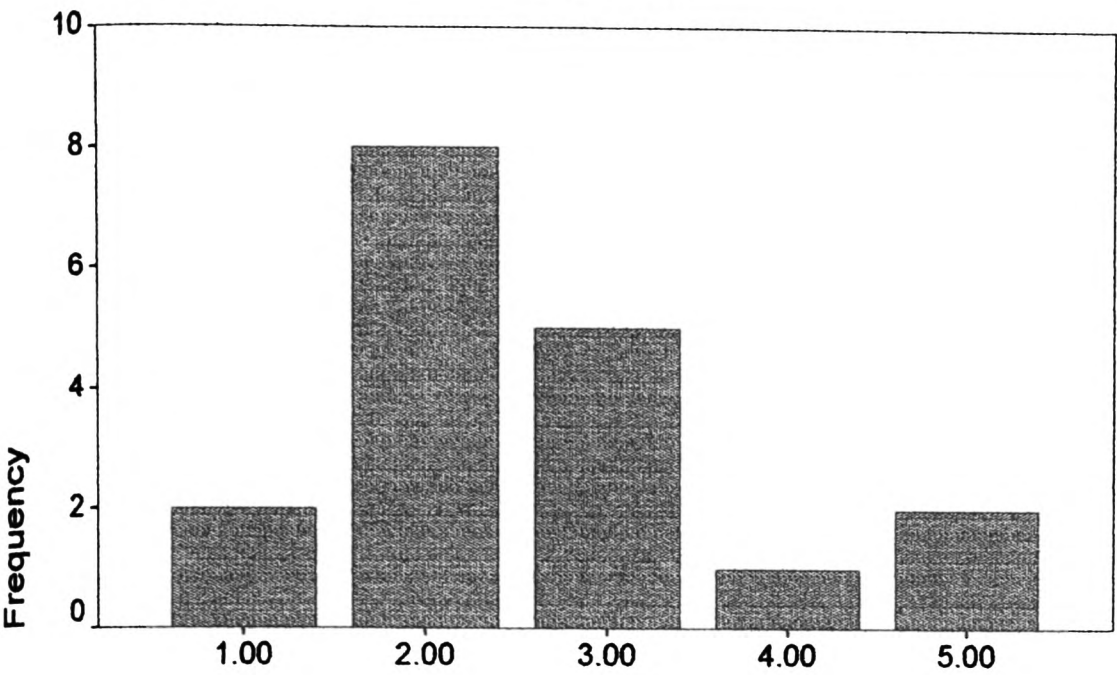


q60

Bar Chart

q1

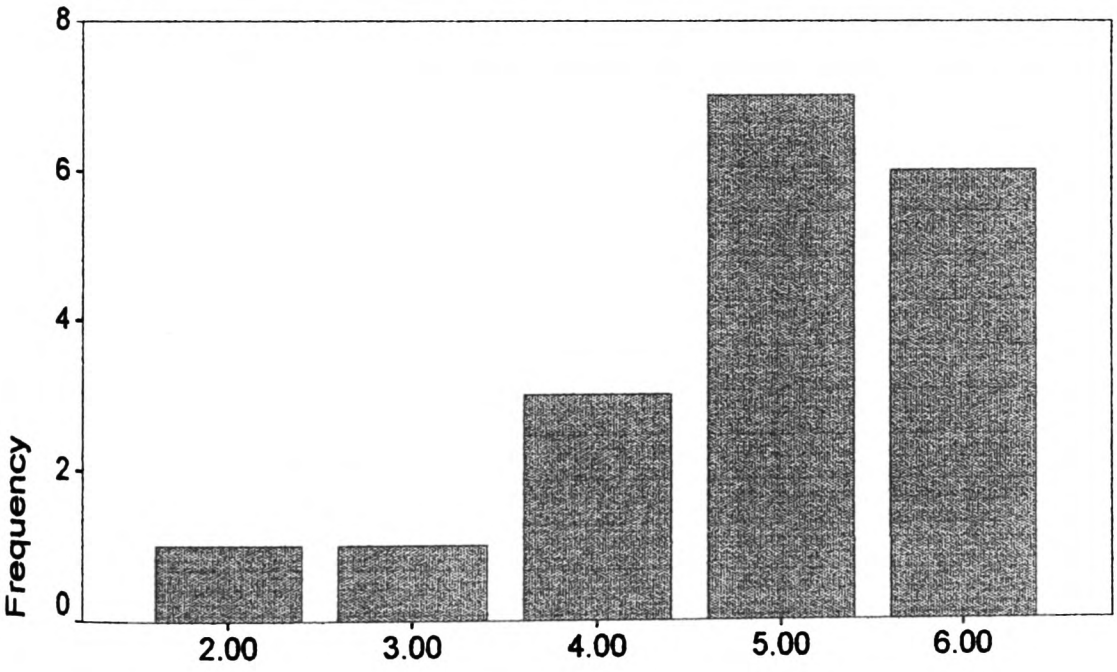
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q1

q2

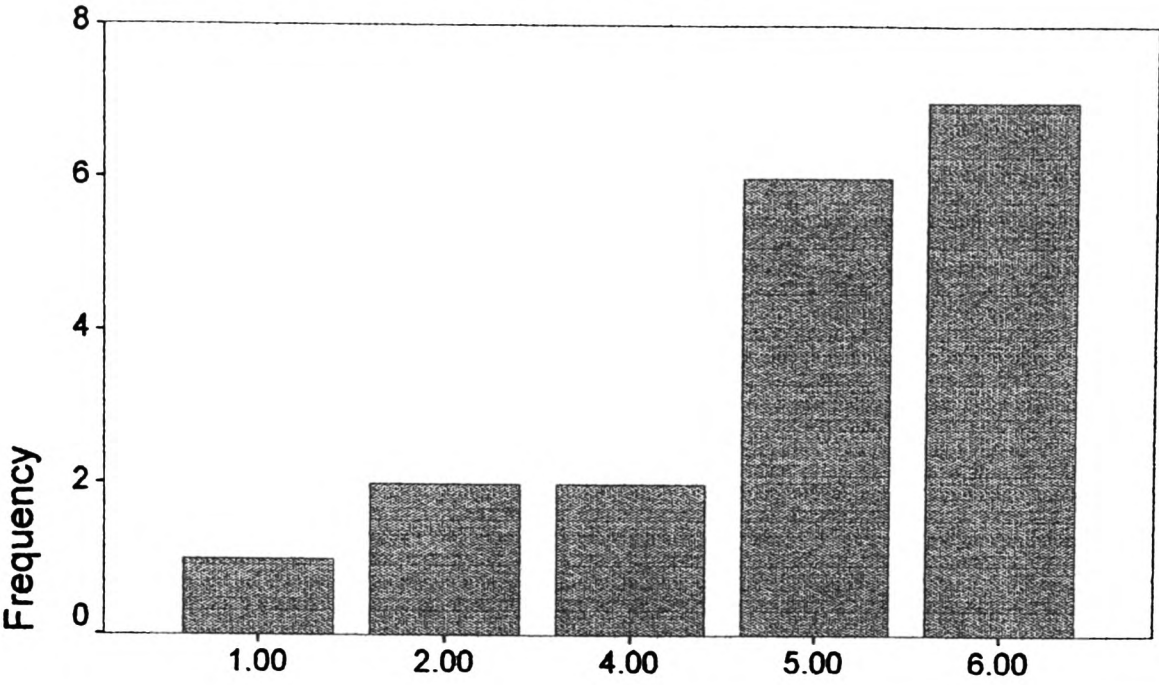
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q2

q3

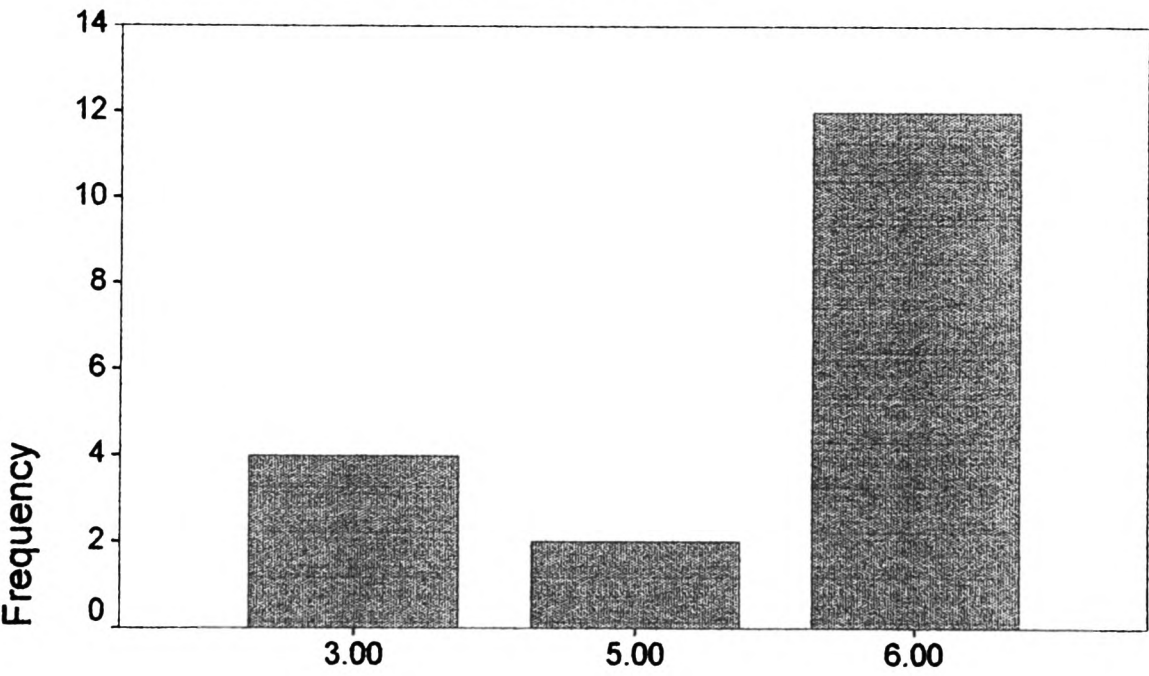
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q3

q4

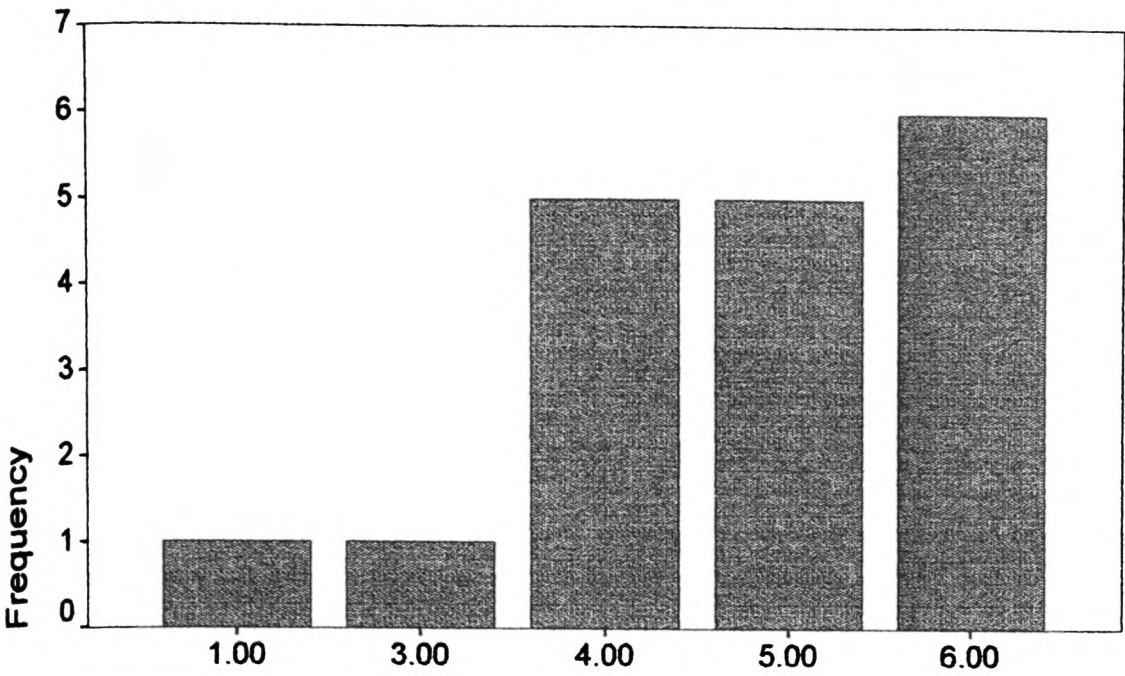
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q4

q5

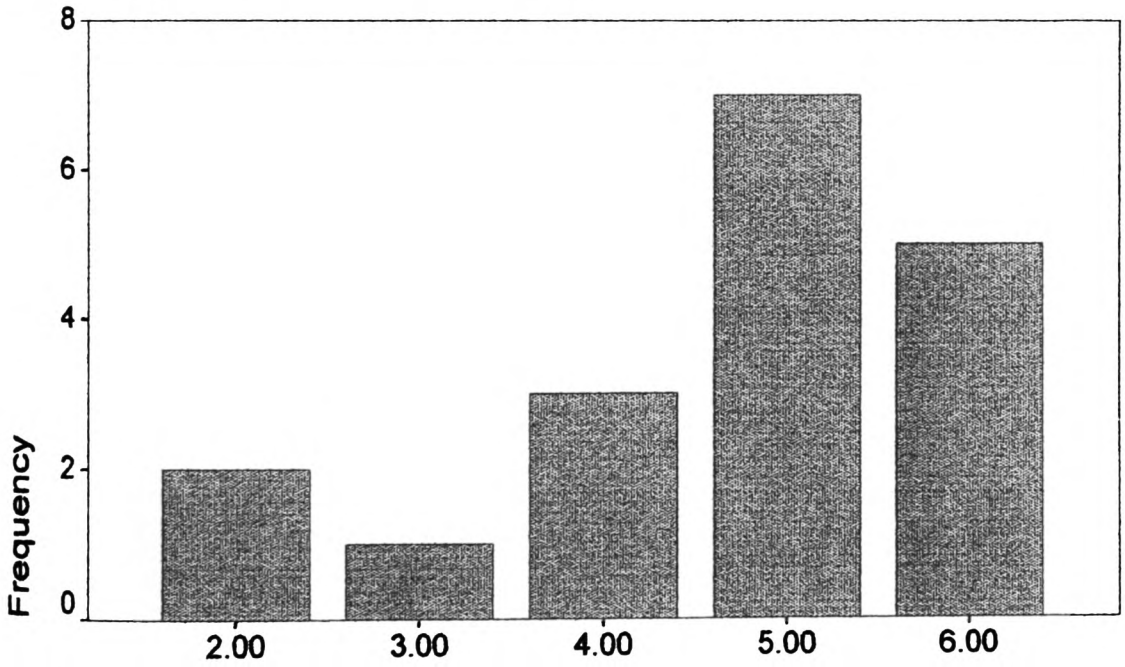
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q5

q6

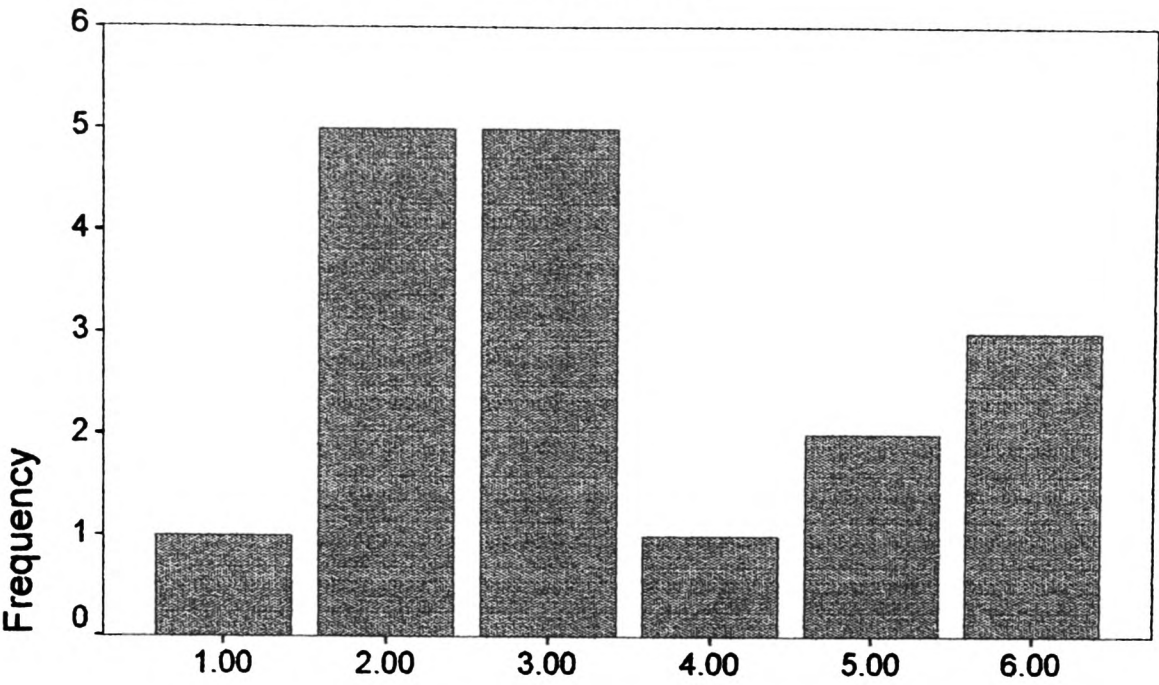
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q6

q7

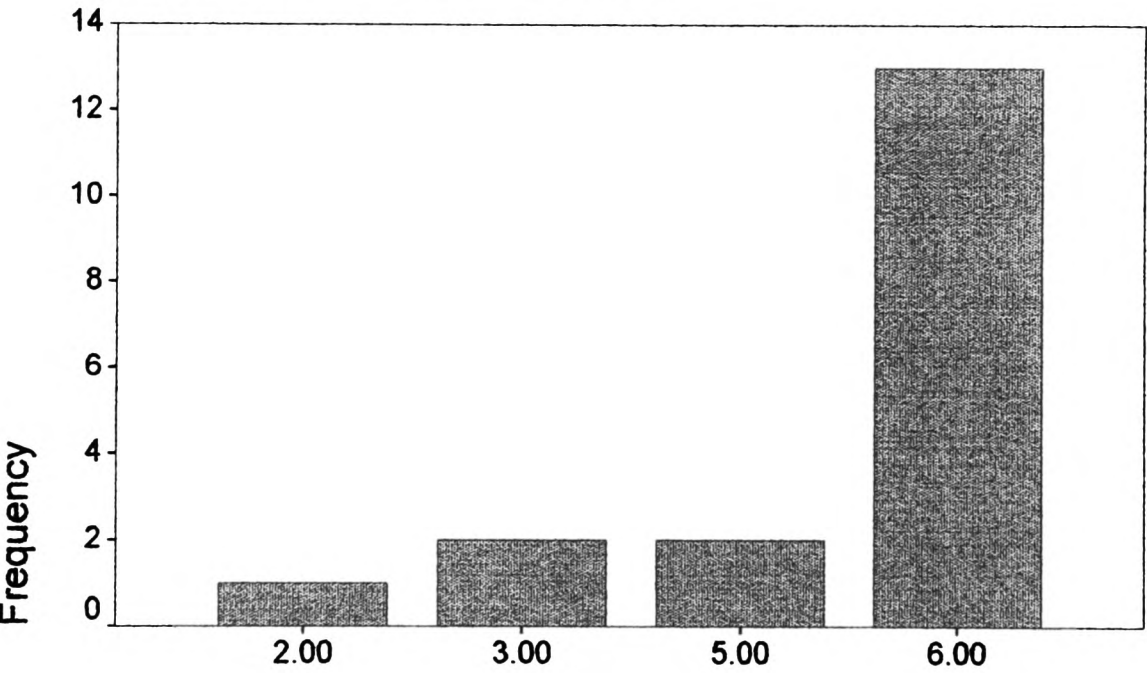
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q7

q8

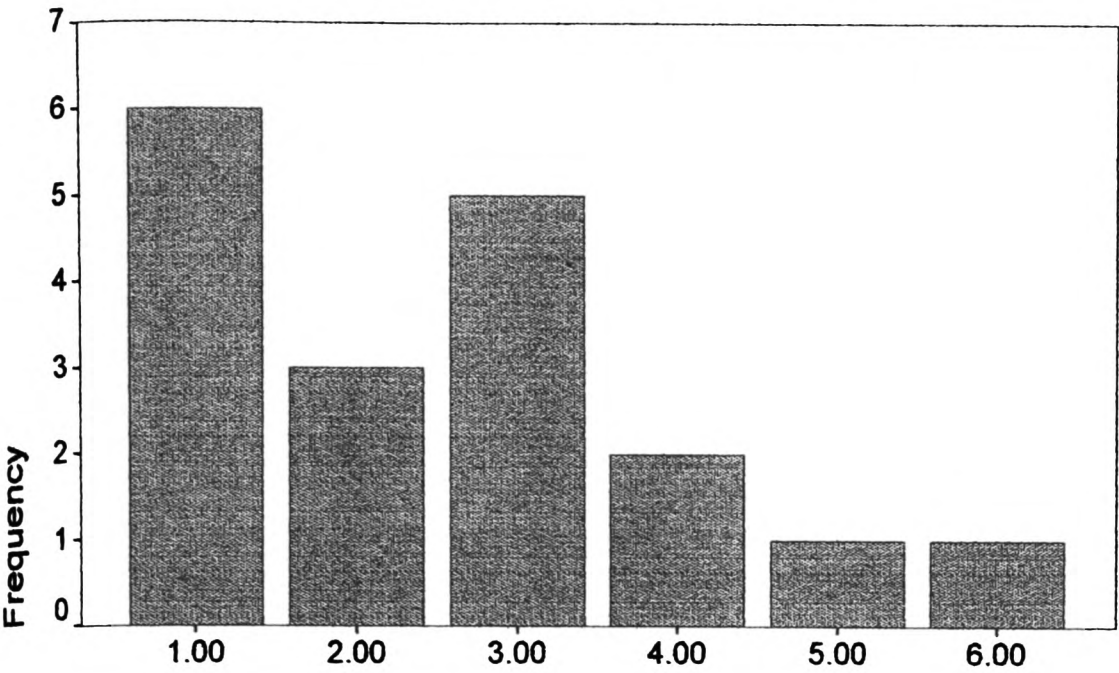
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q8

q9

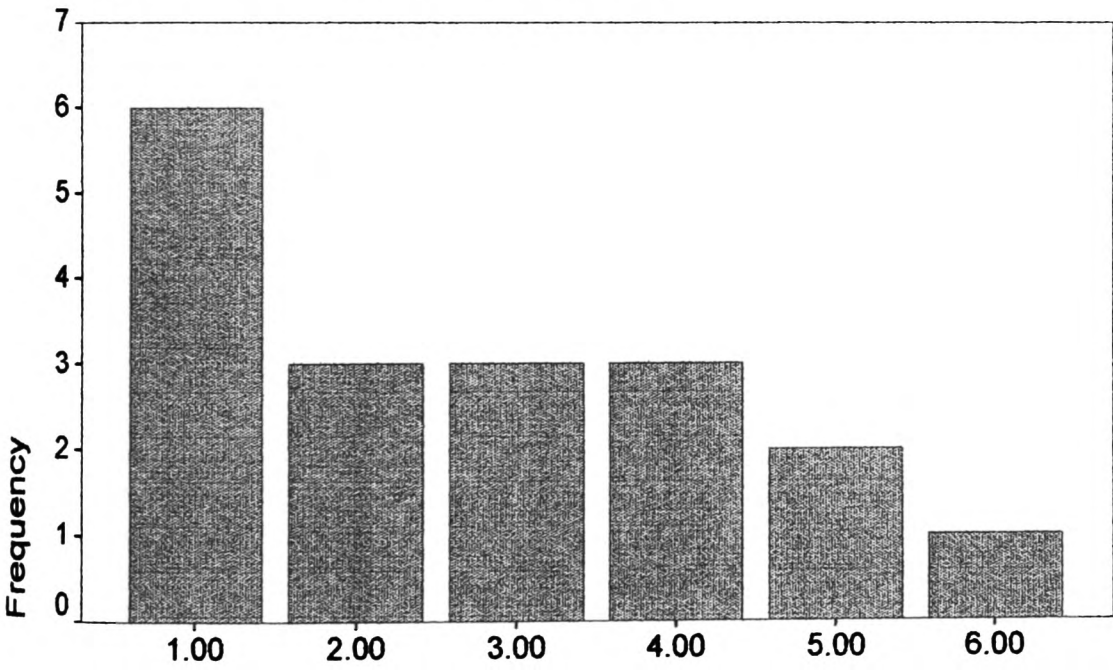
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q9

q10

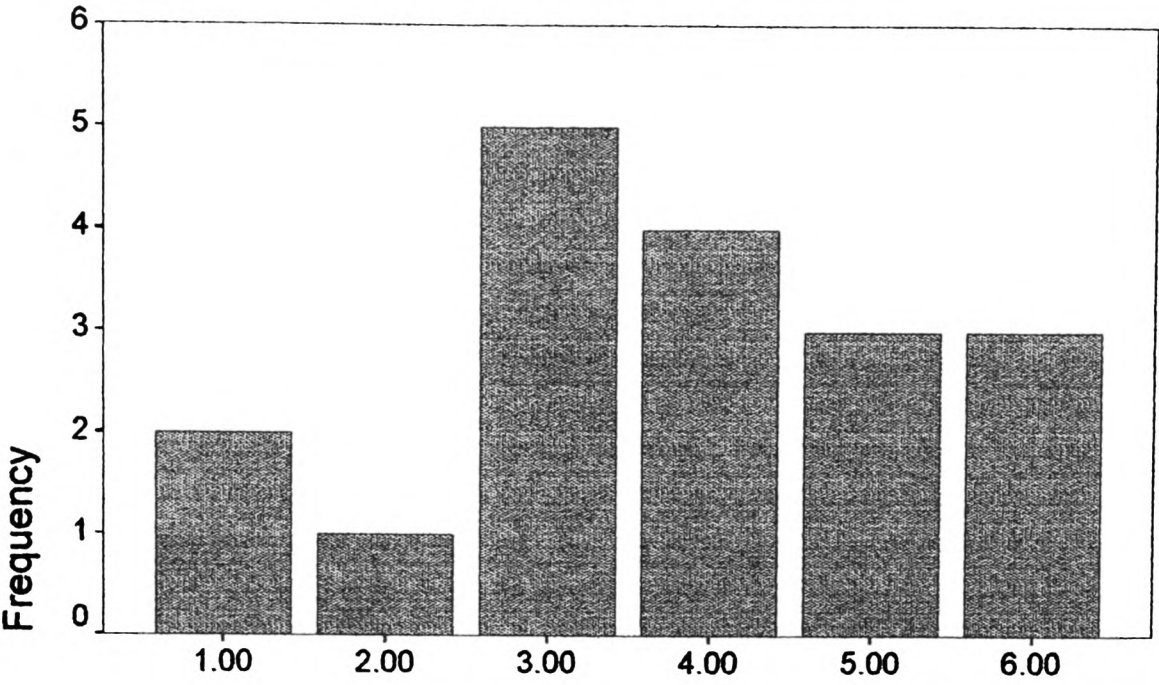
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q10

q11

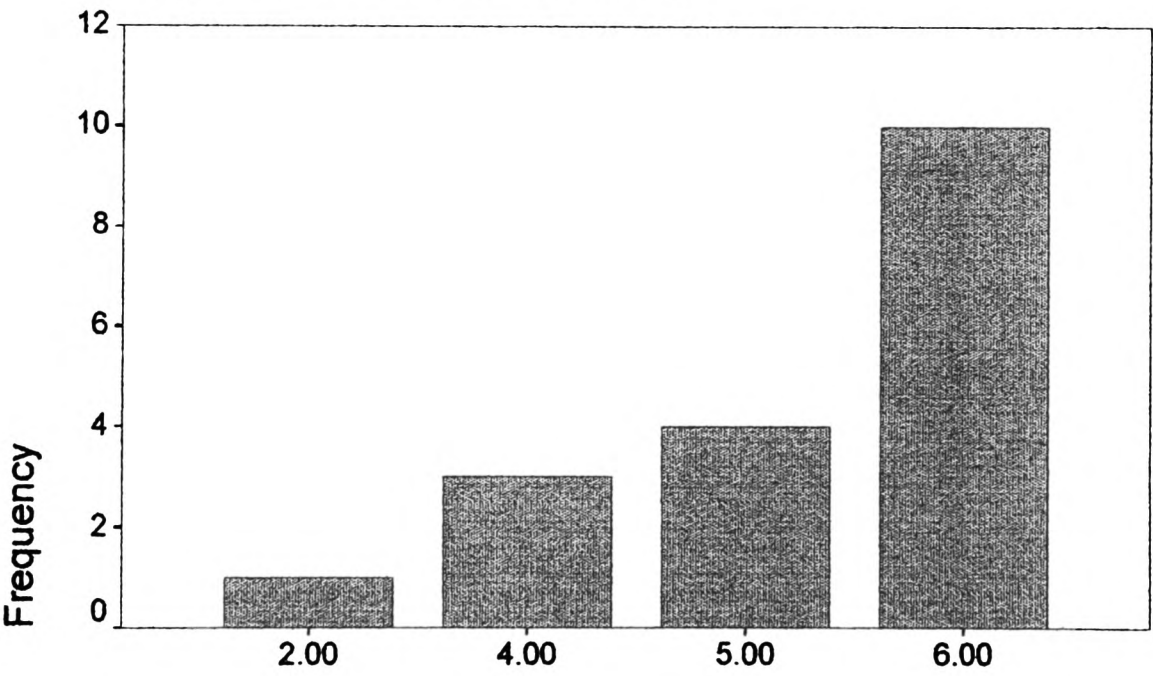
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q11

q12

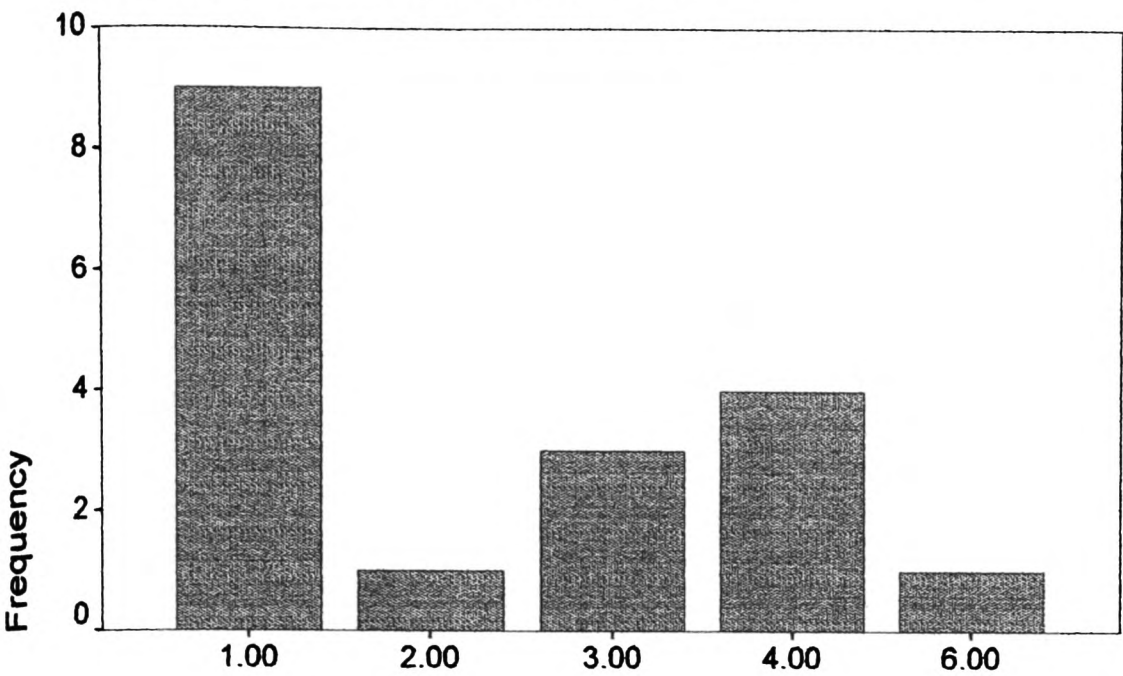
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q12

q13

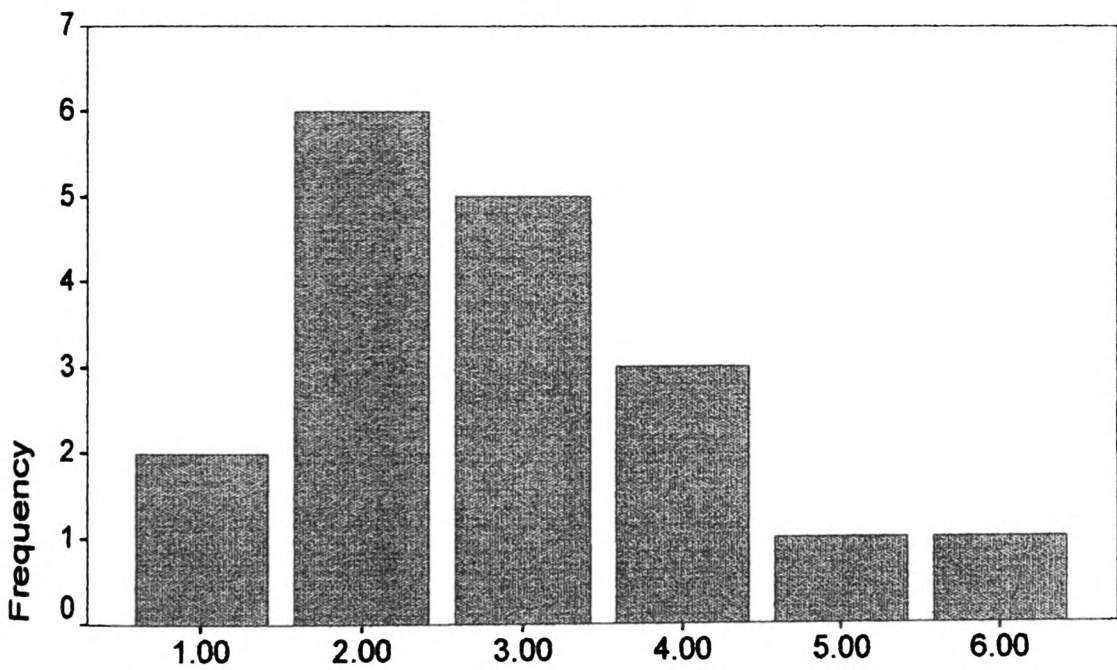
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q13

q14

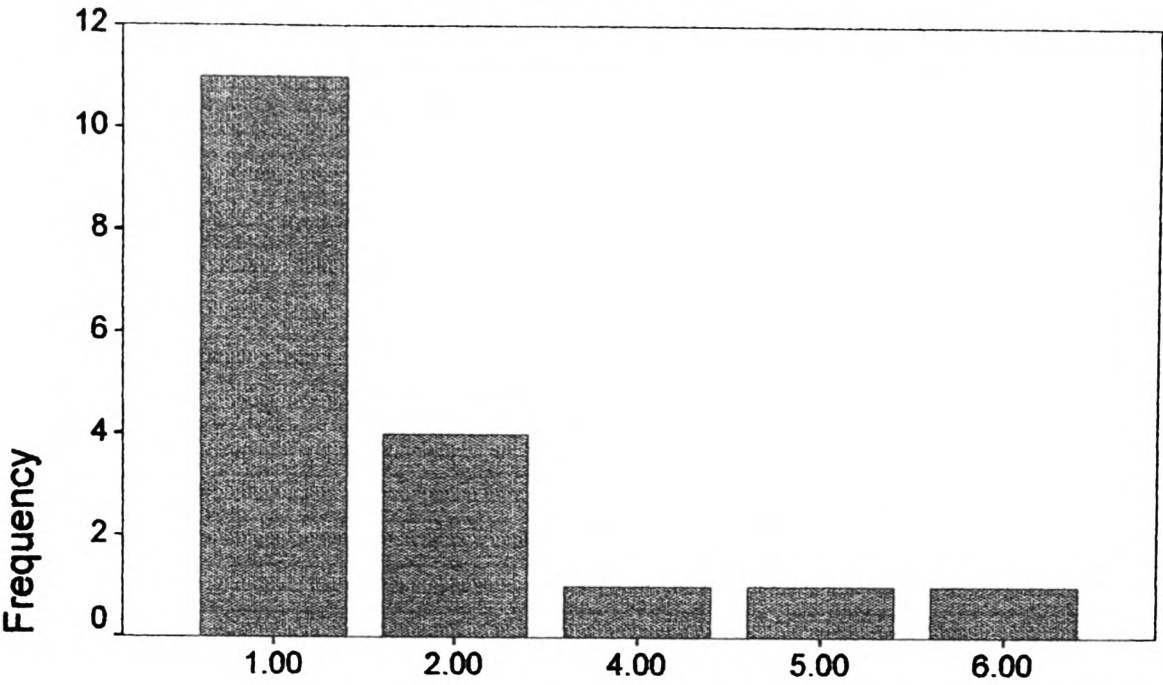
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q14

q15

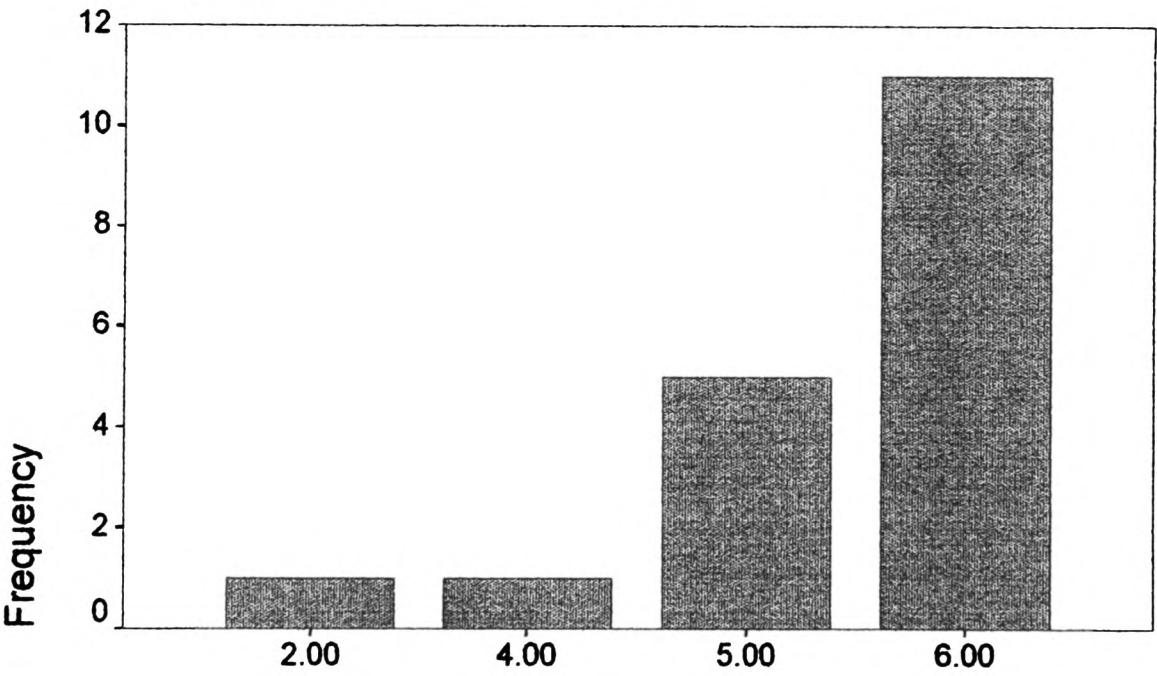
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q15

q16

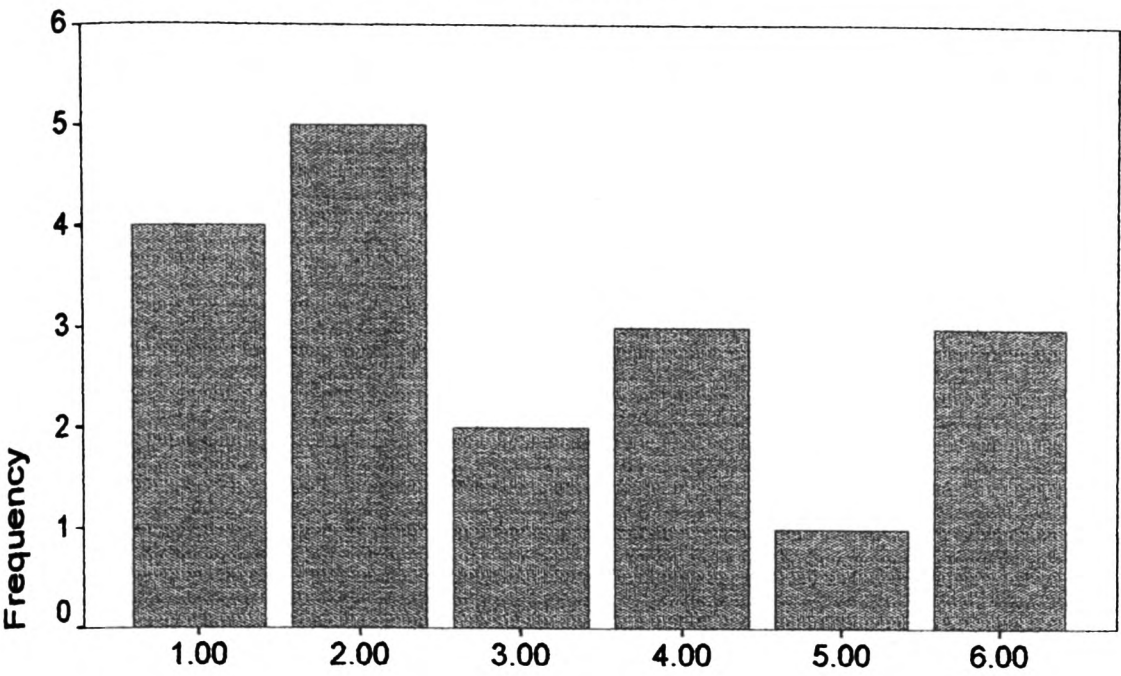
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q16

q17

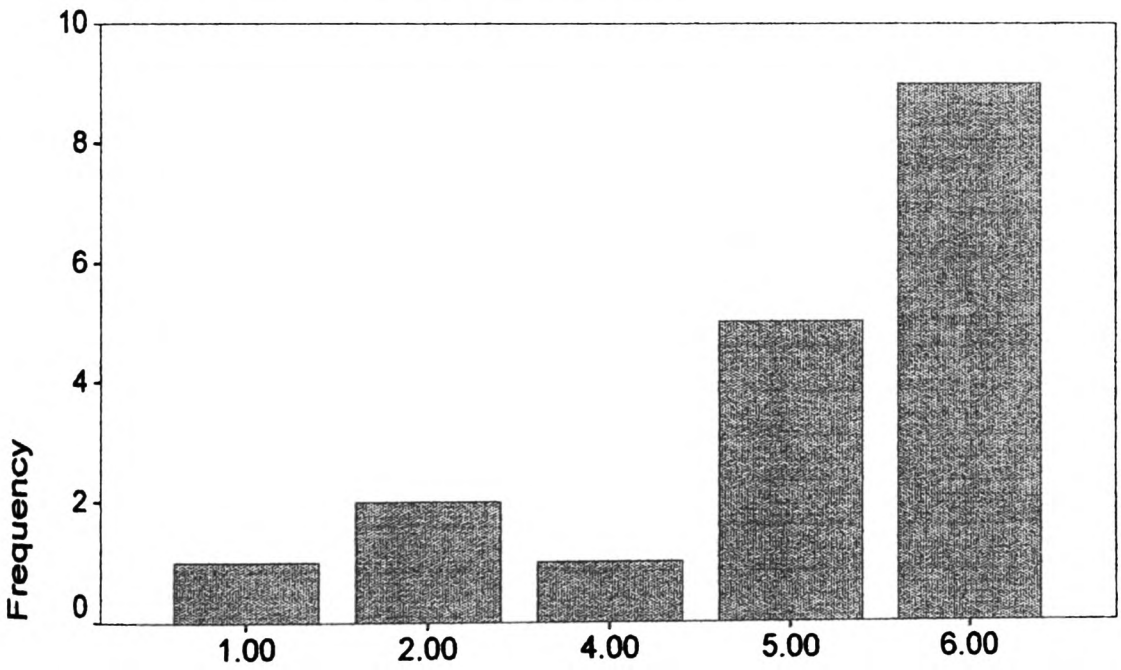
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q17

q18

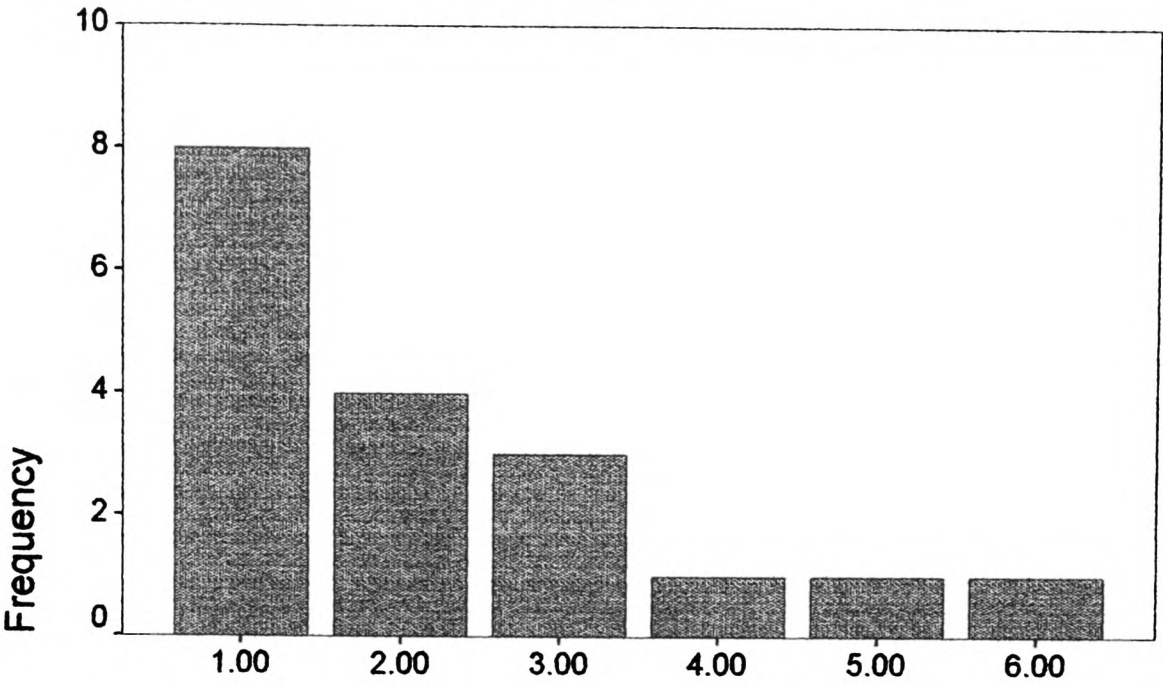
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q18

q19

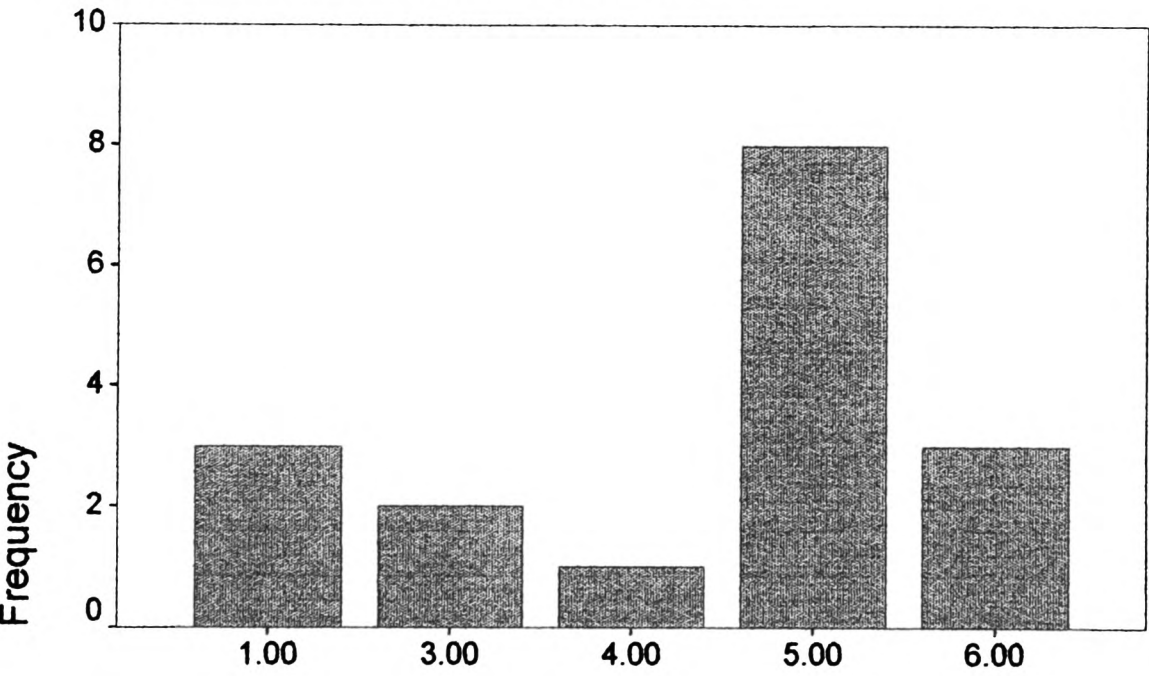
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q19

q20

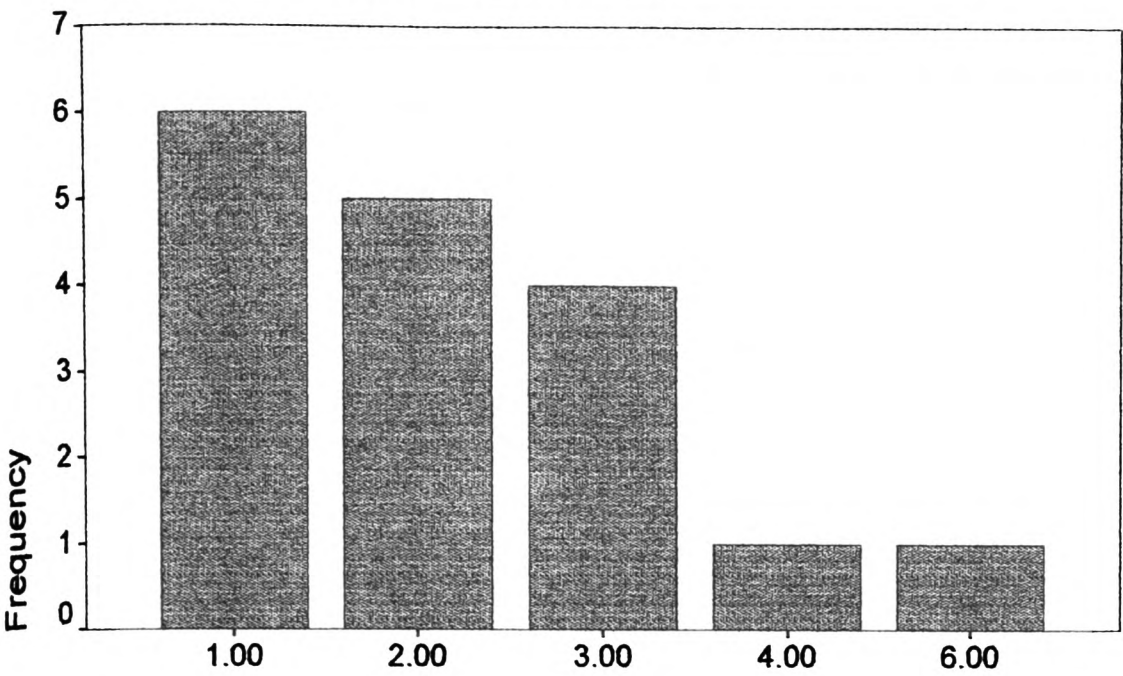
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q20

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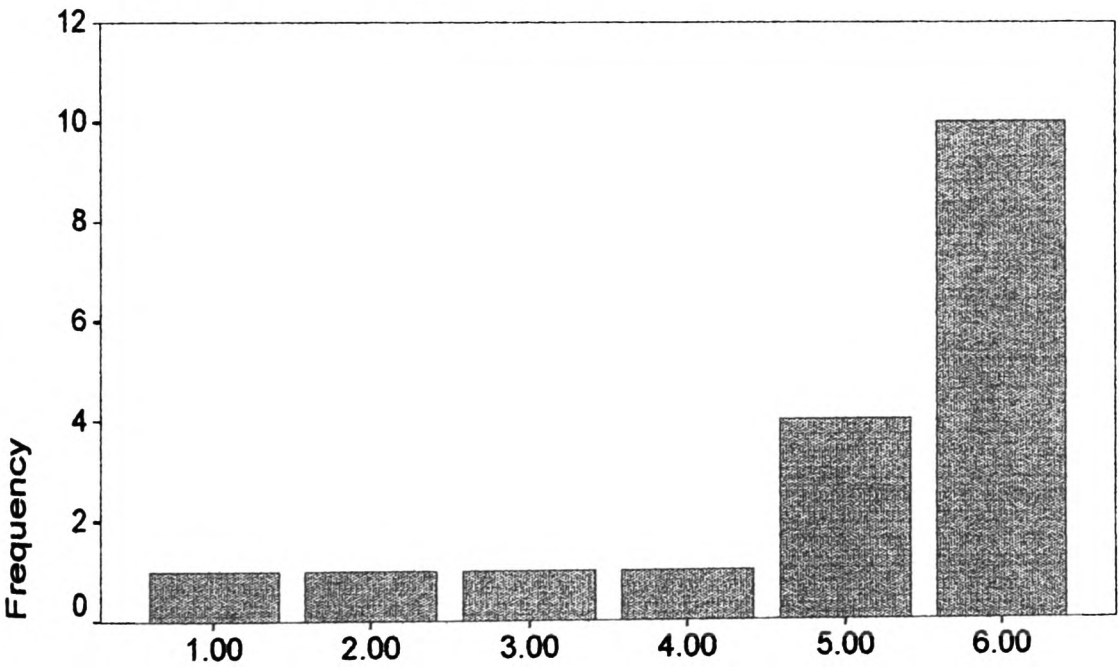
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q21

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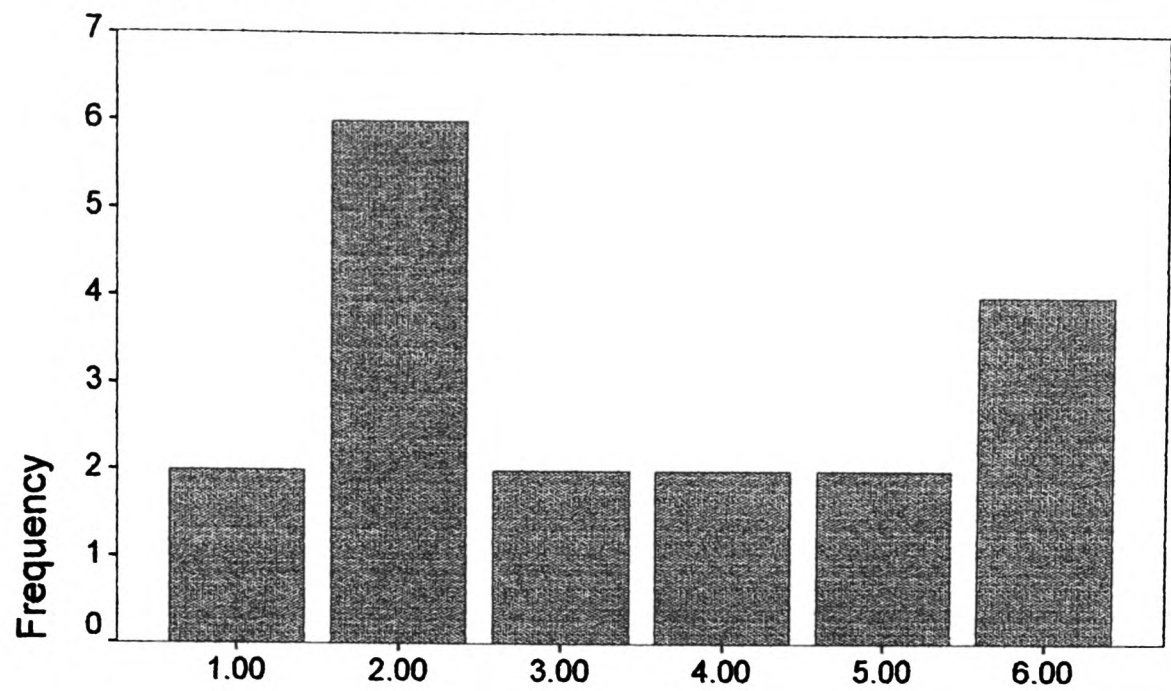
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q22

q23

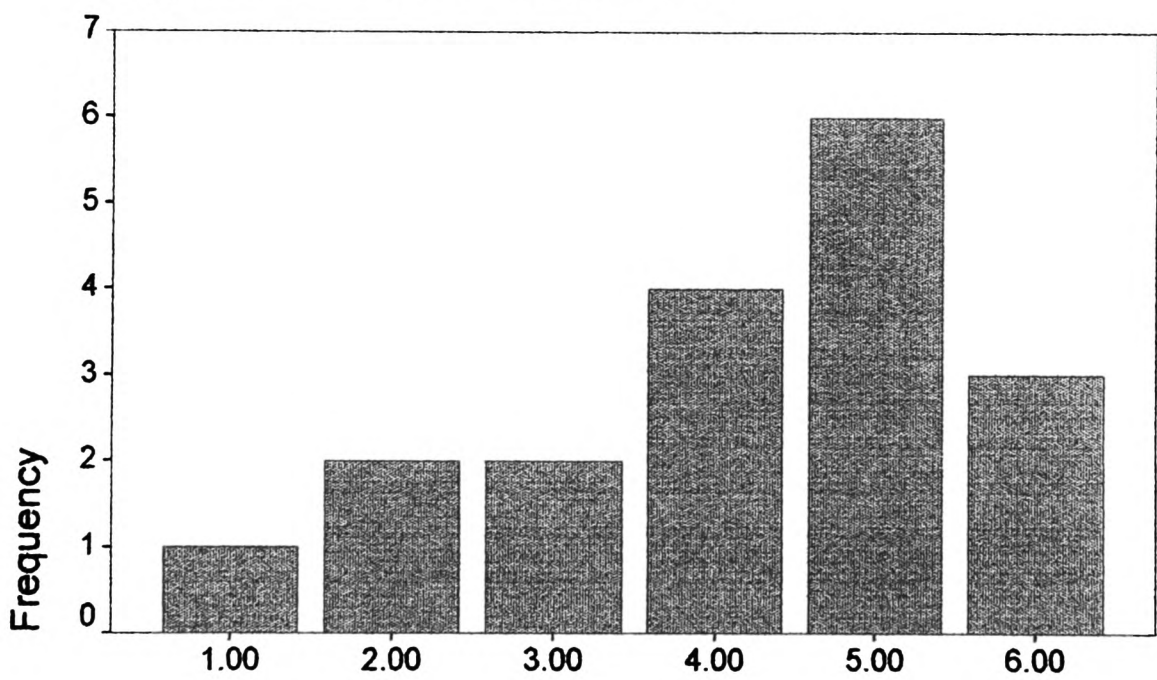
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q23

q24

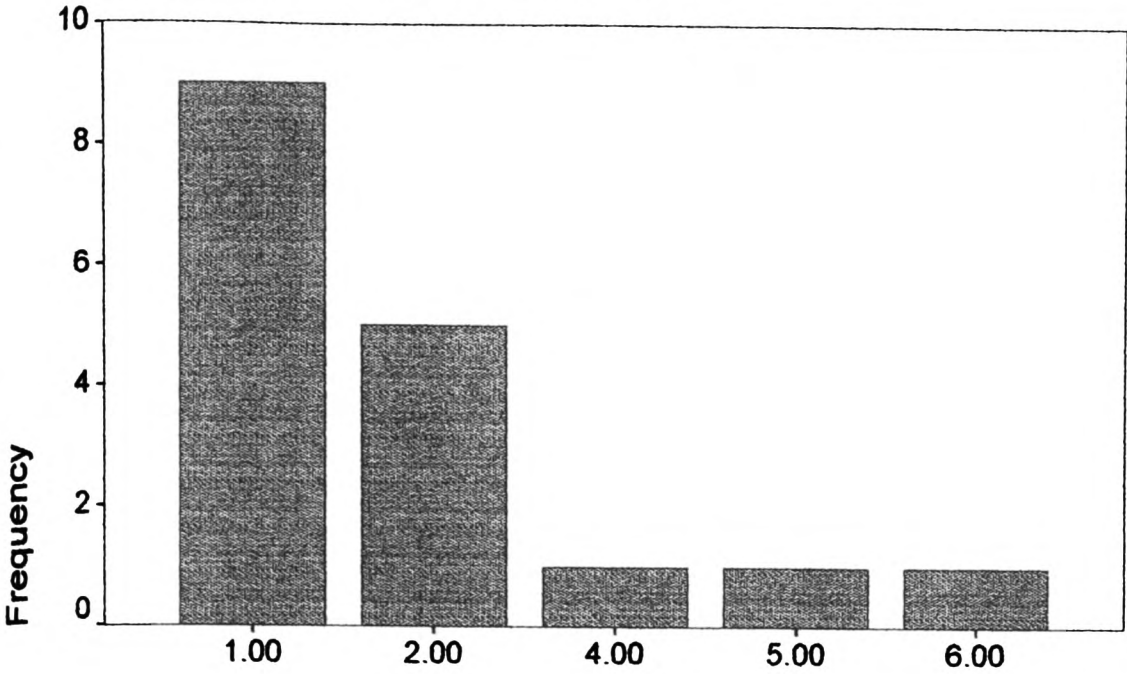
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q24

q25

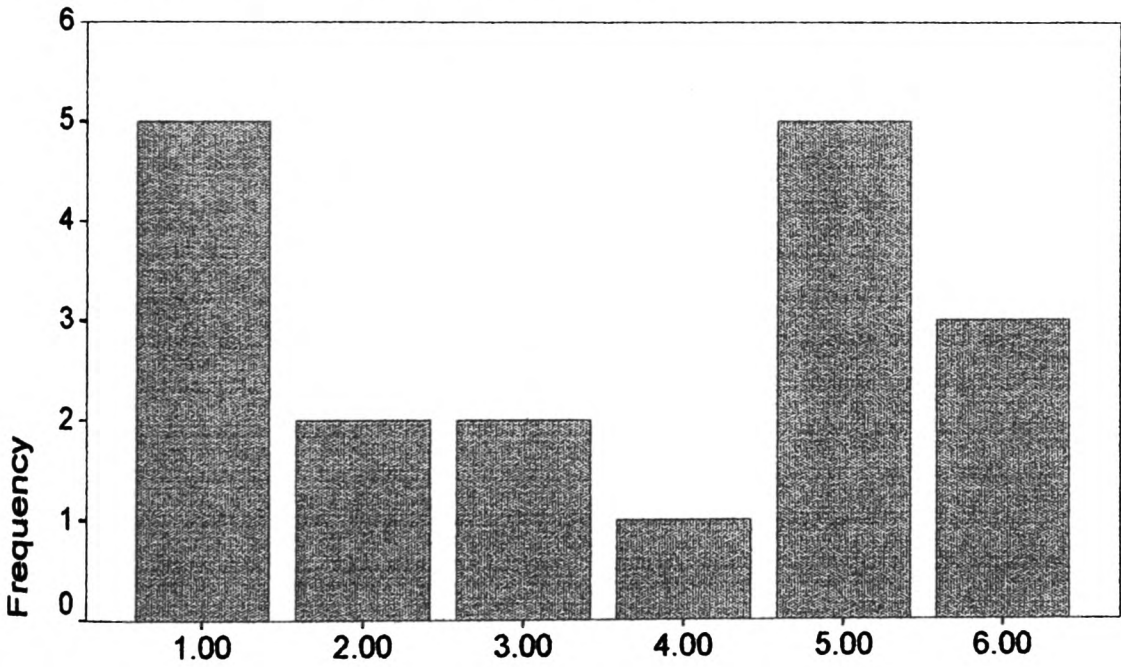
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q25

q26

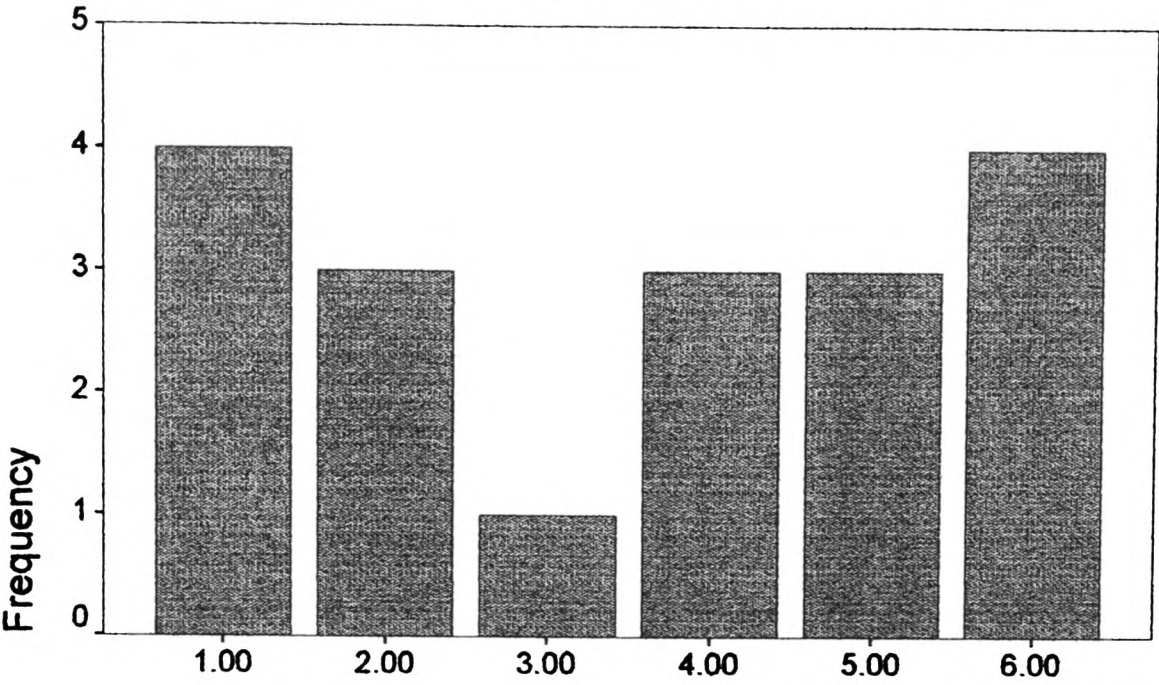
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q26

q27

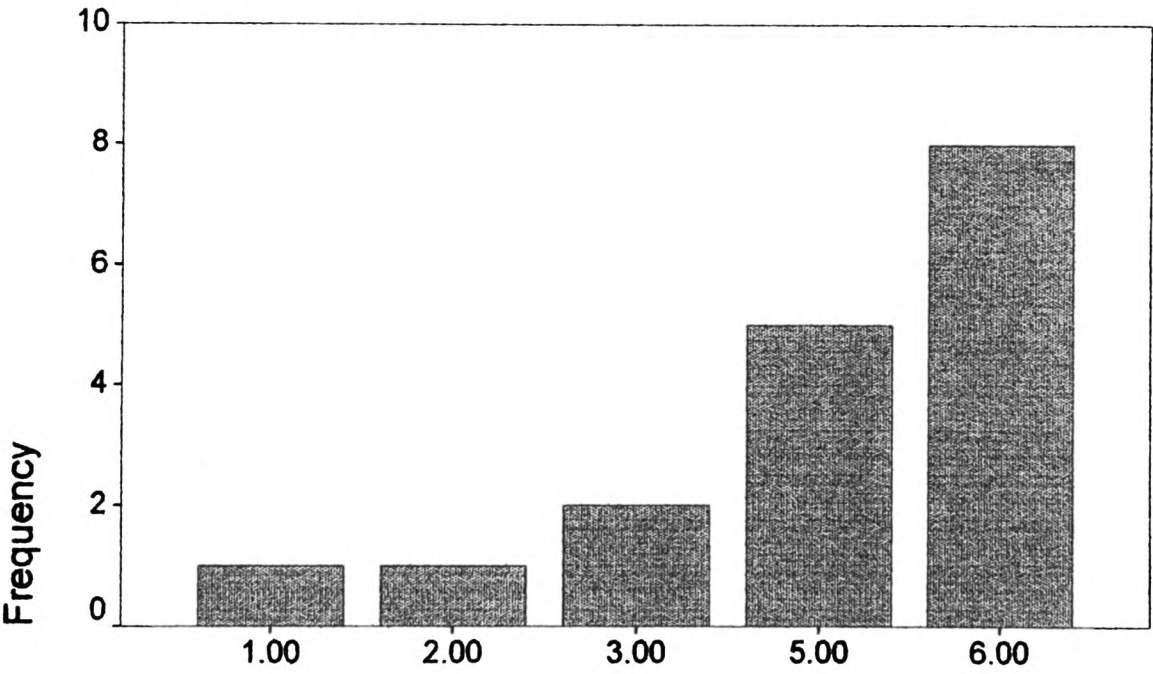
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q27

q28

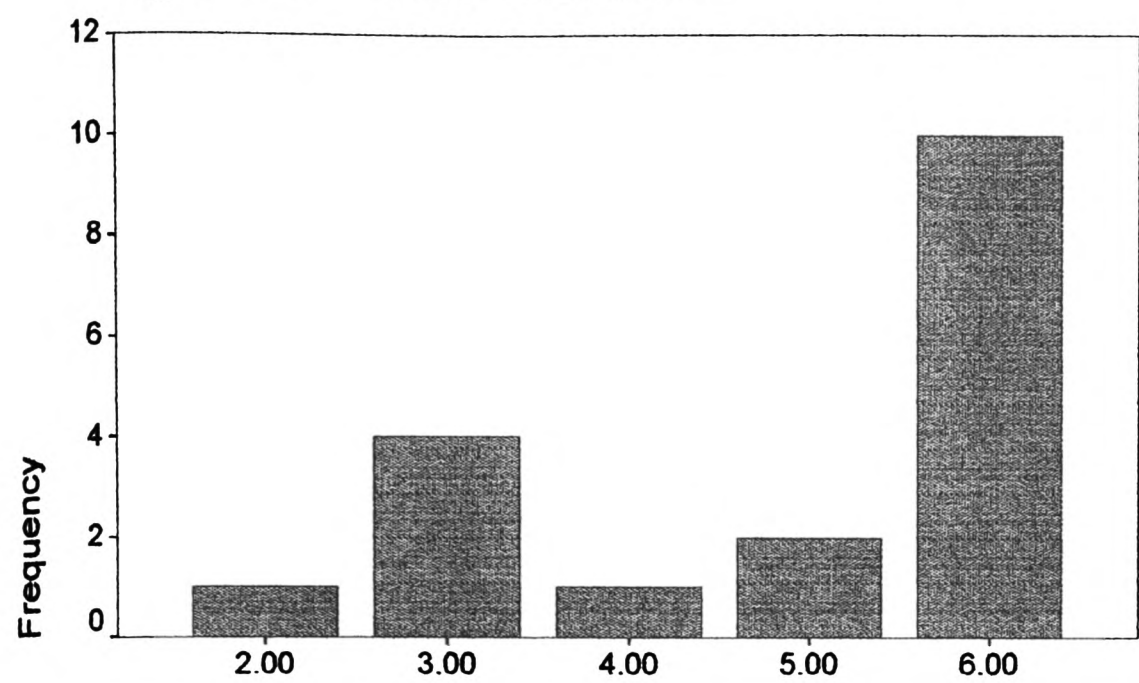
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q28

q29

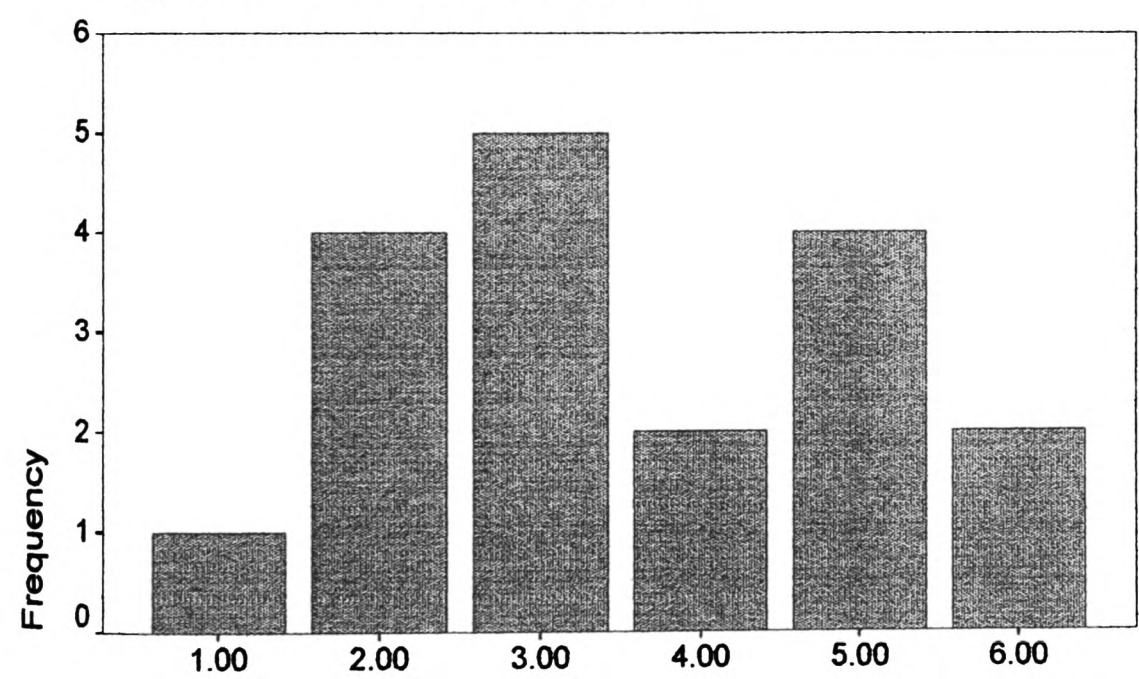
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q29

q30

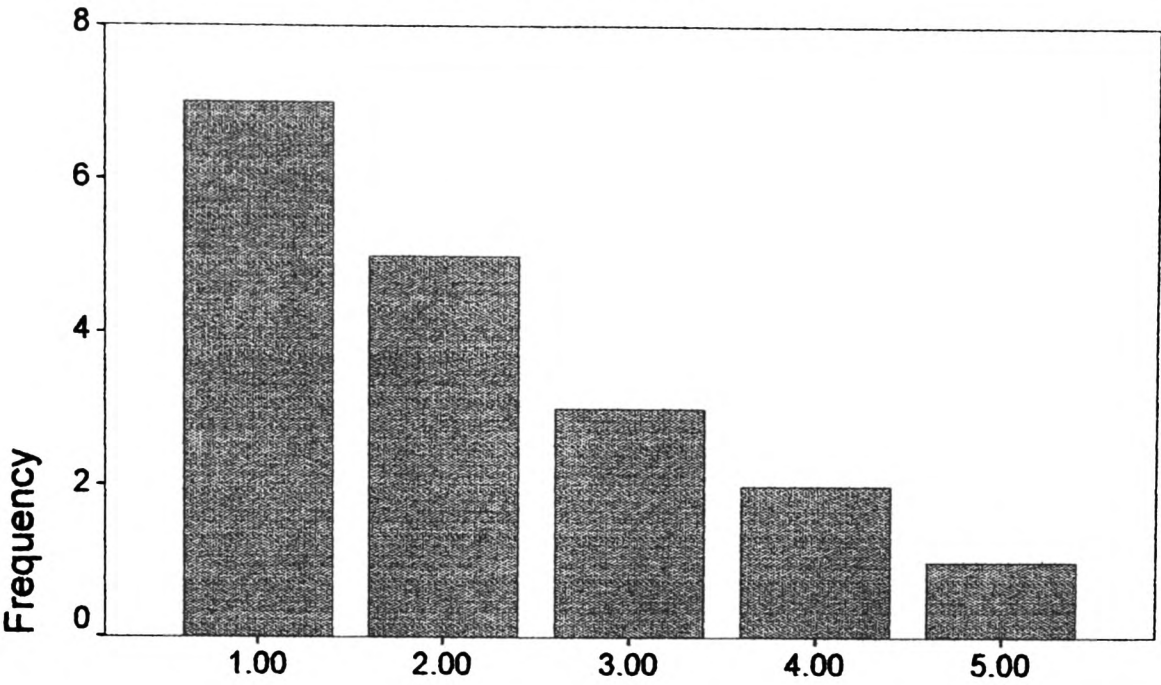
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q30

q31

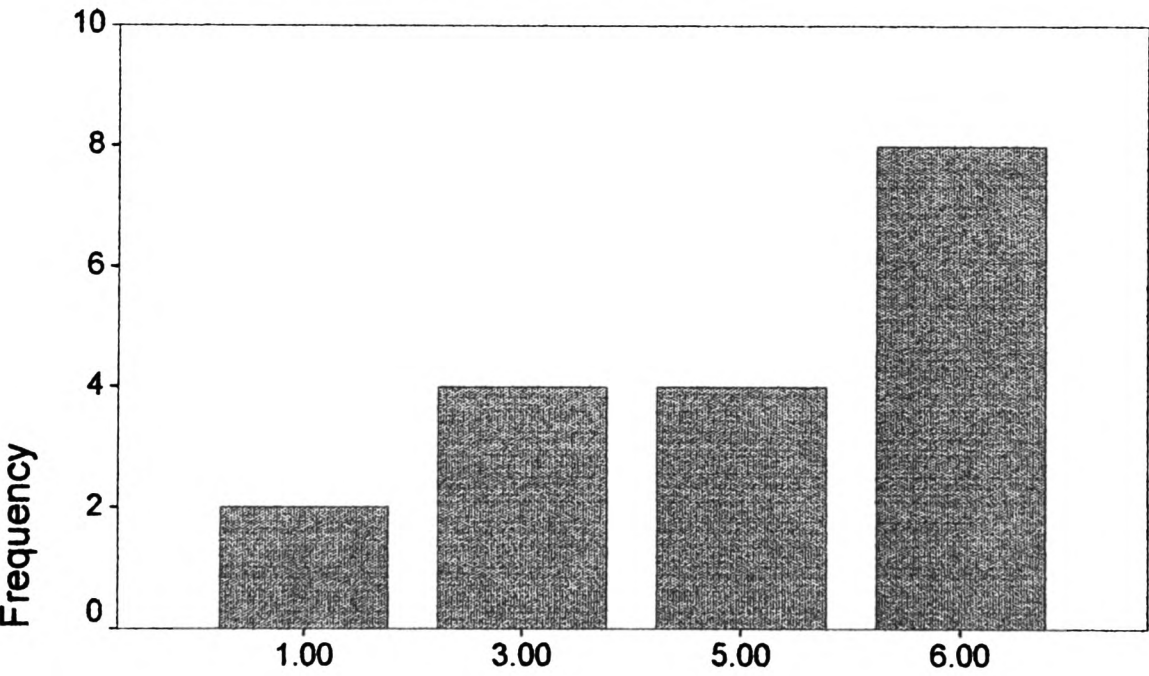
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q31

q32

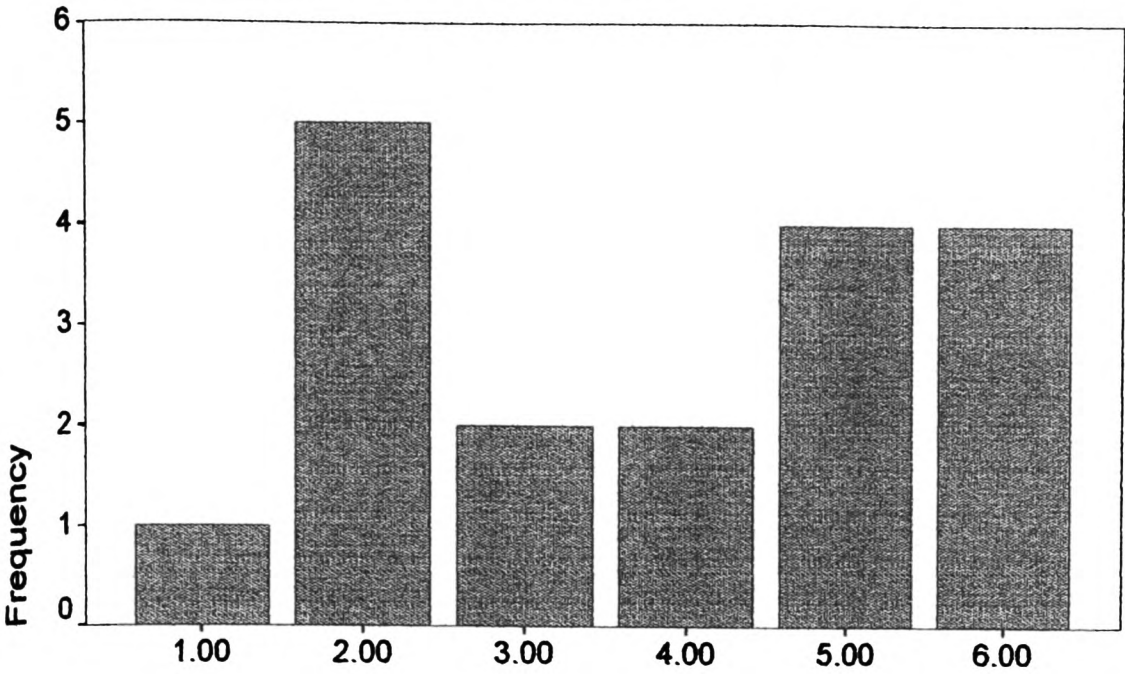
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q32

q33

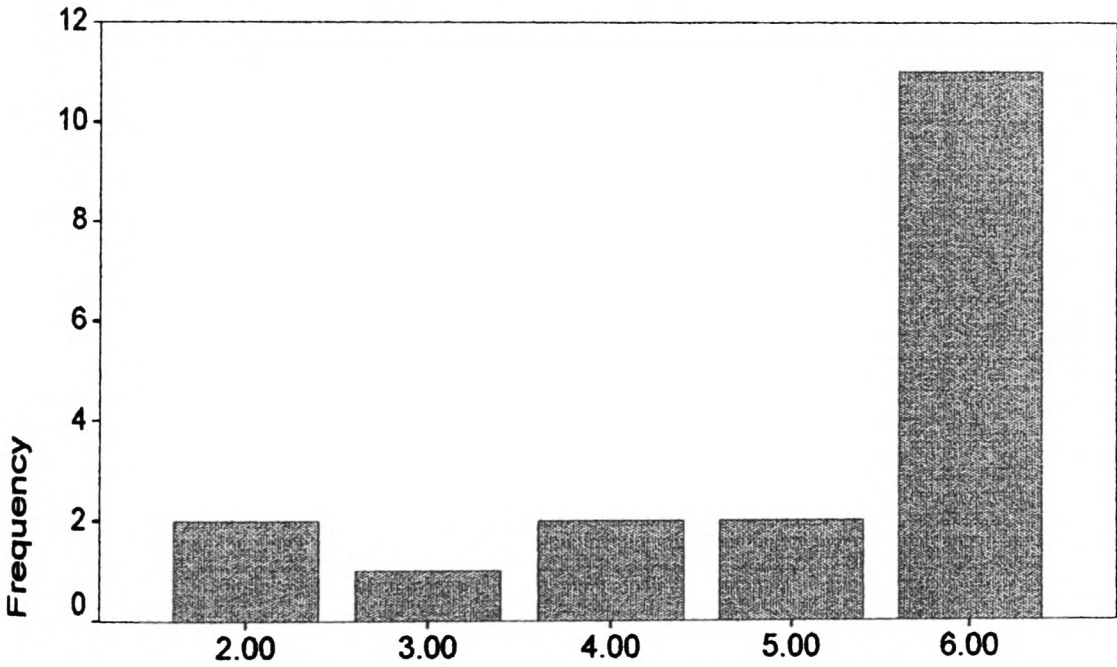
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q33

q34

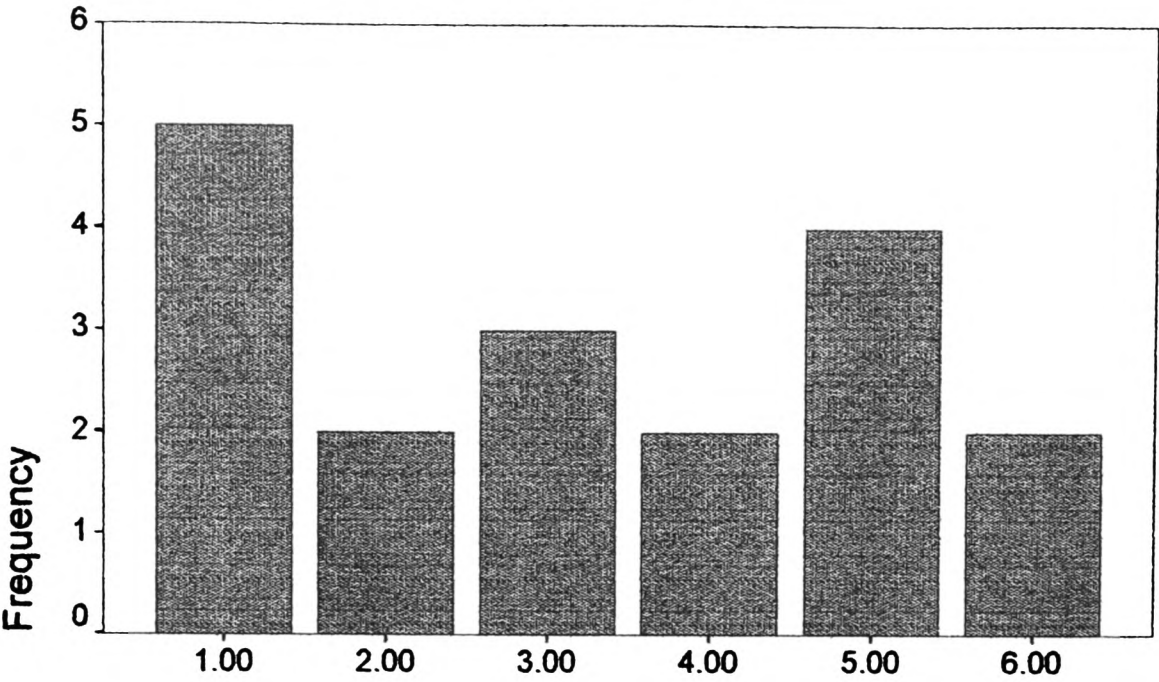
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q34

q35

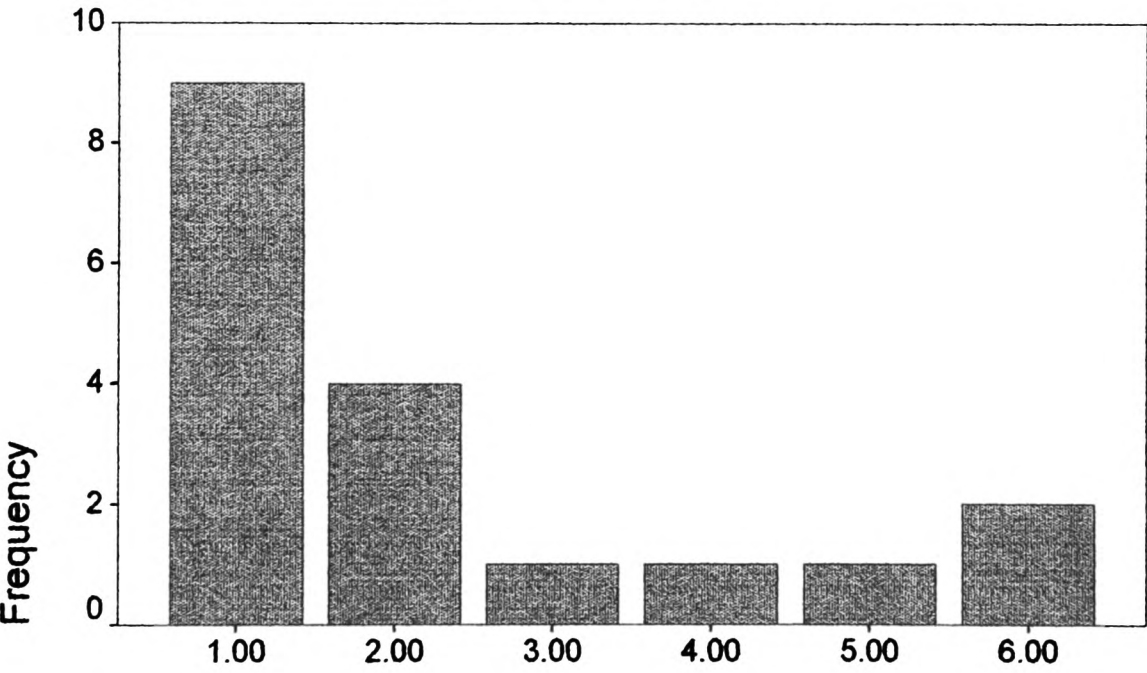
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q35

q36

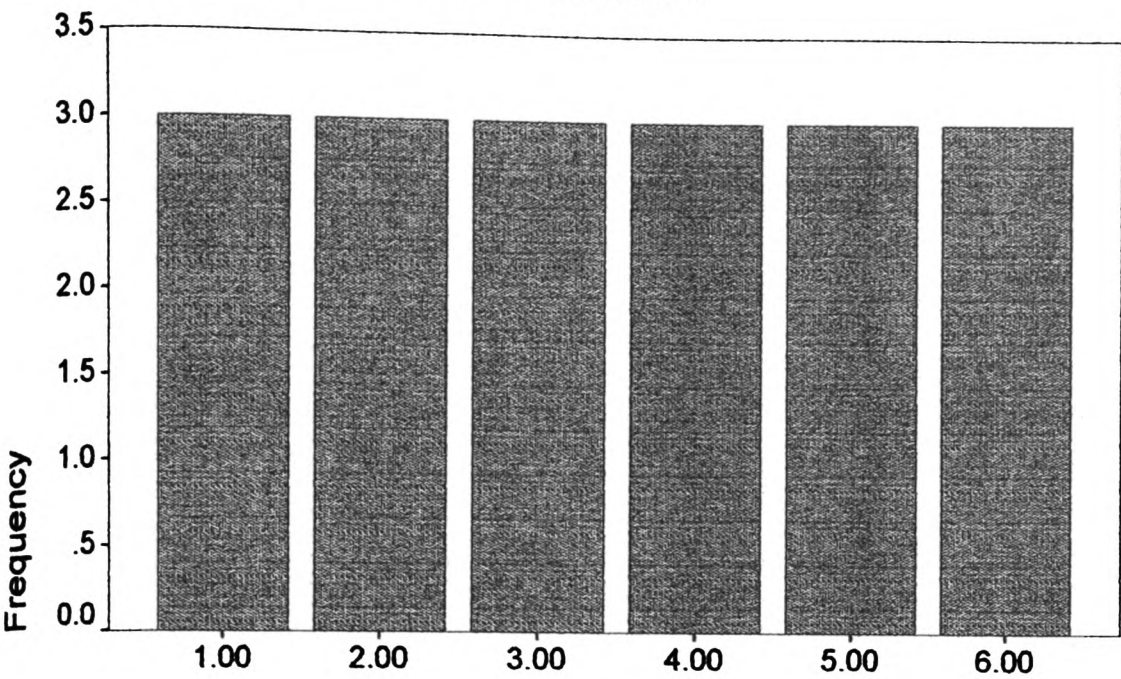
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q36

q37

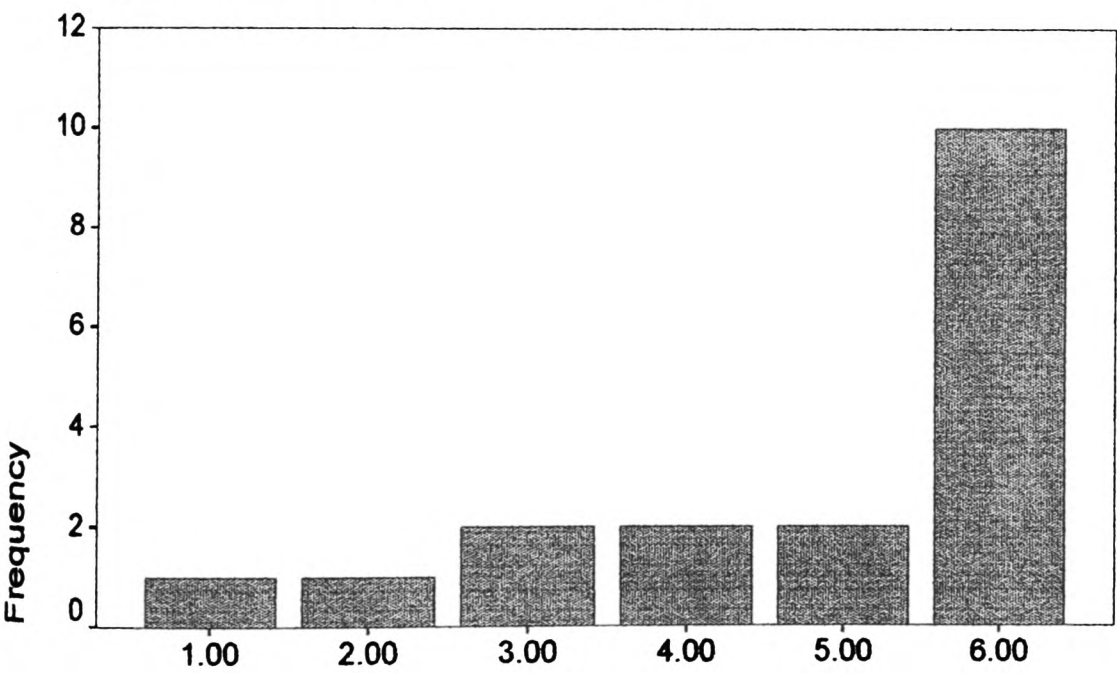
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q37

q38

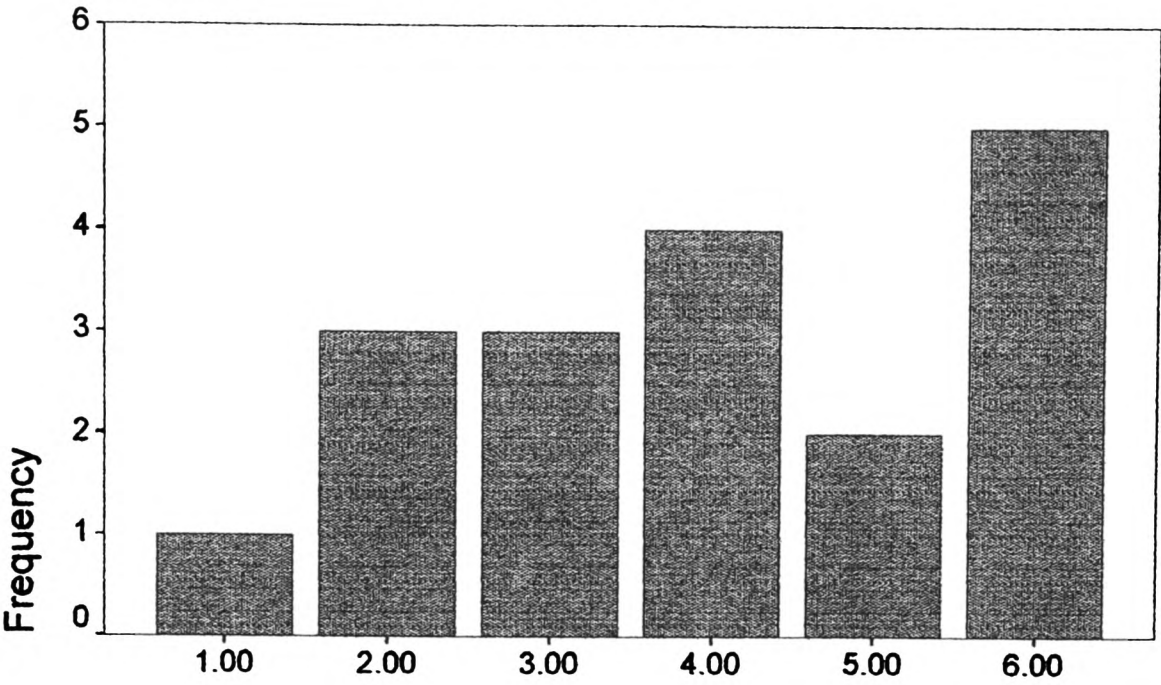
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q38

q39

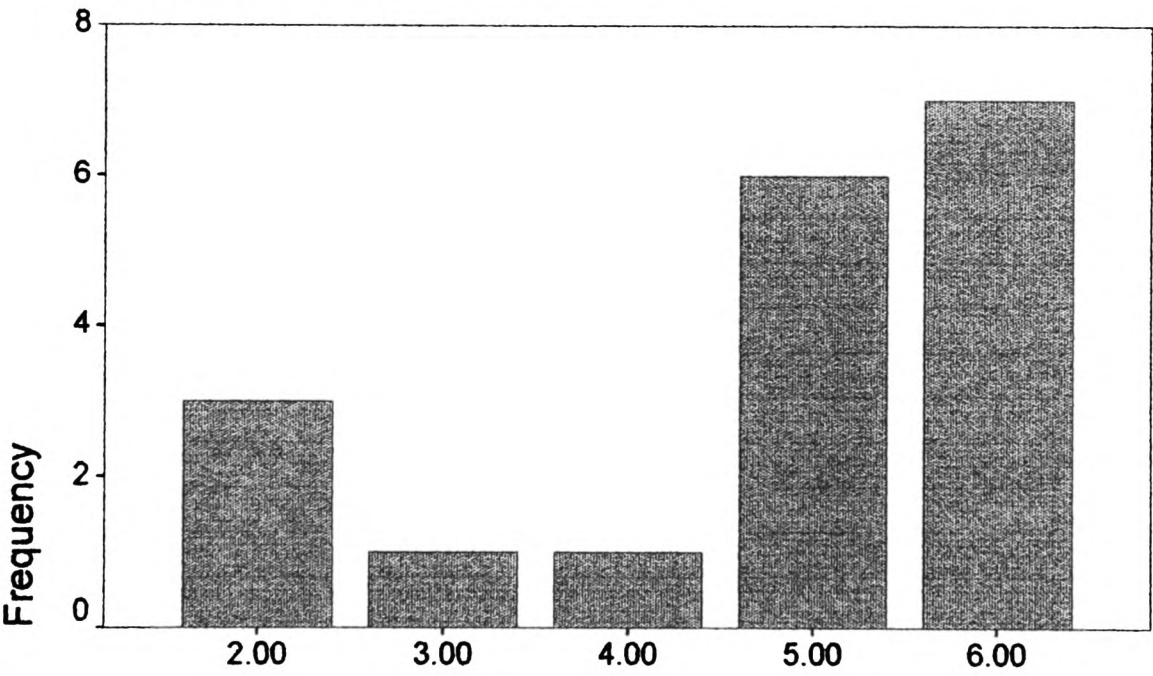
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q39

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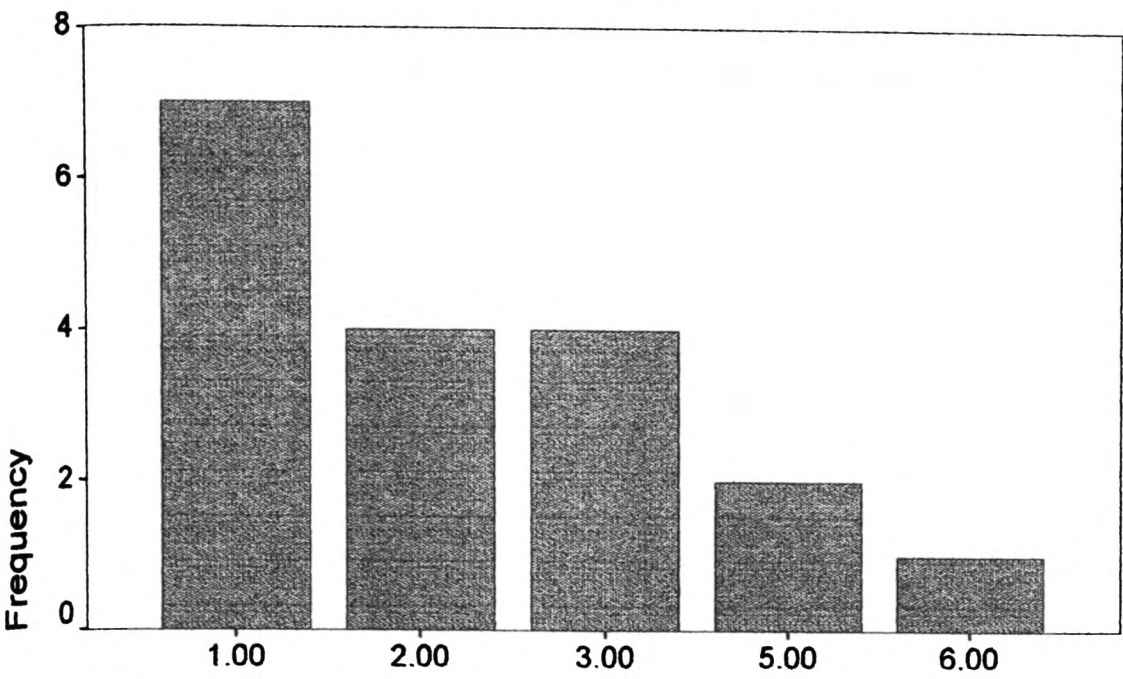
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q40

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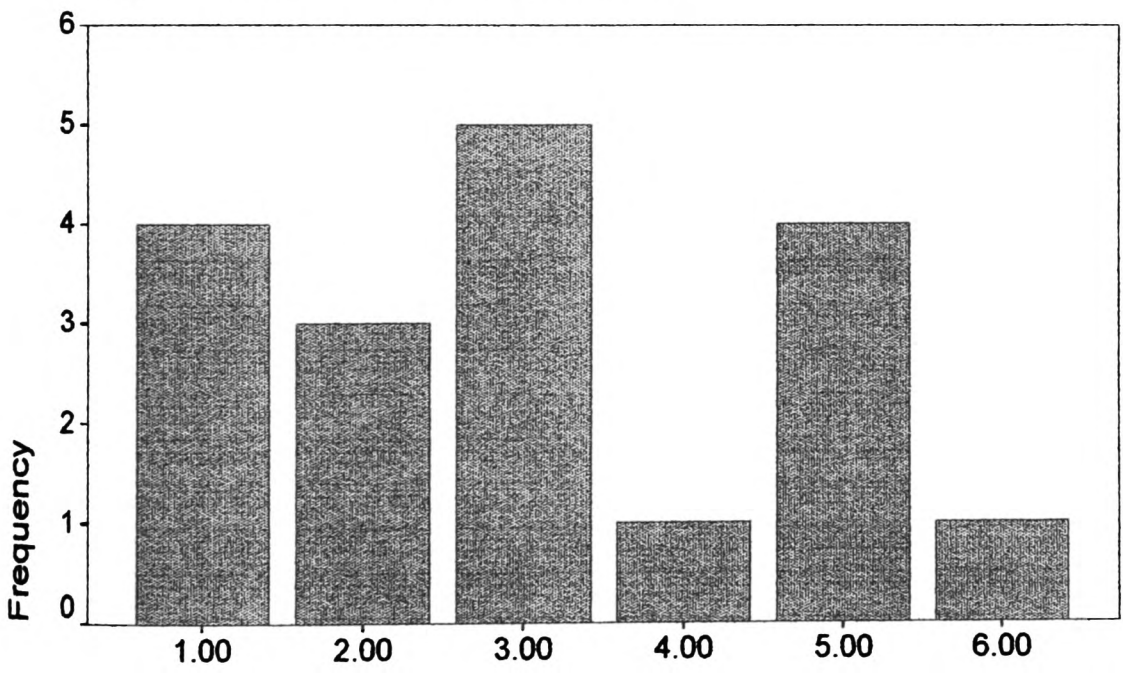
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q41

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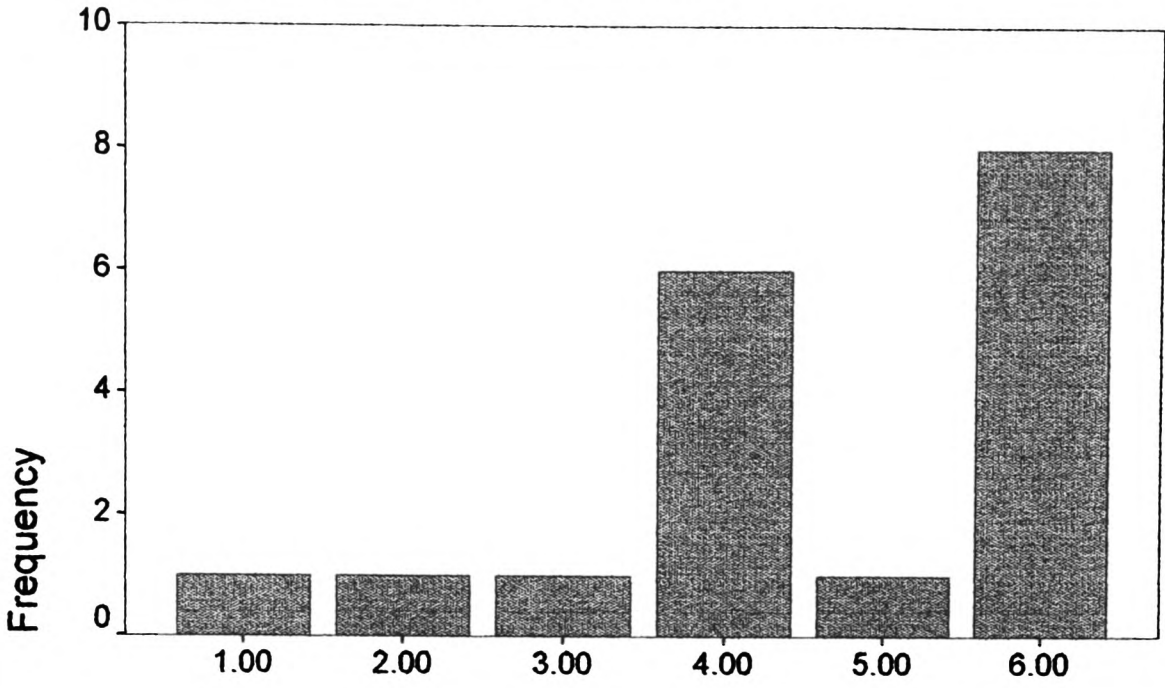
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q42

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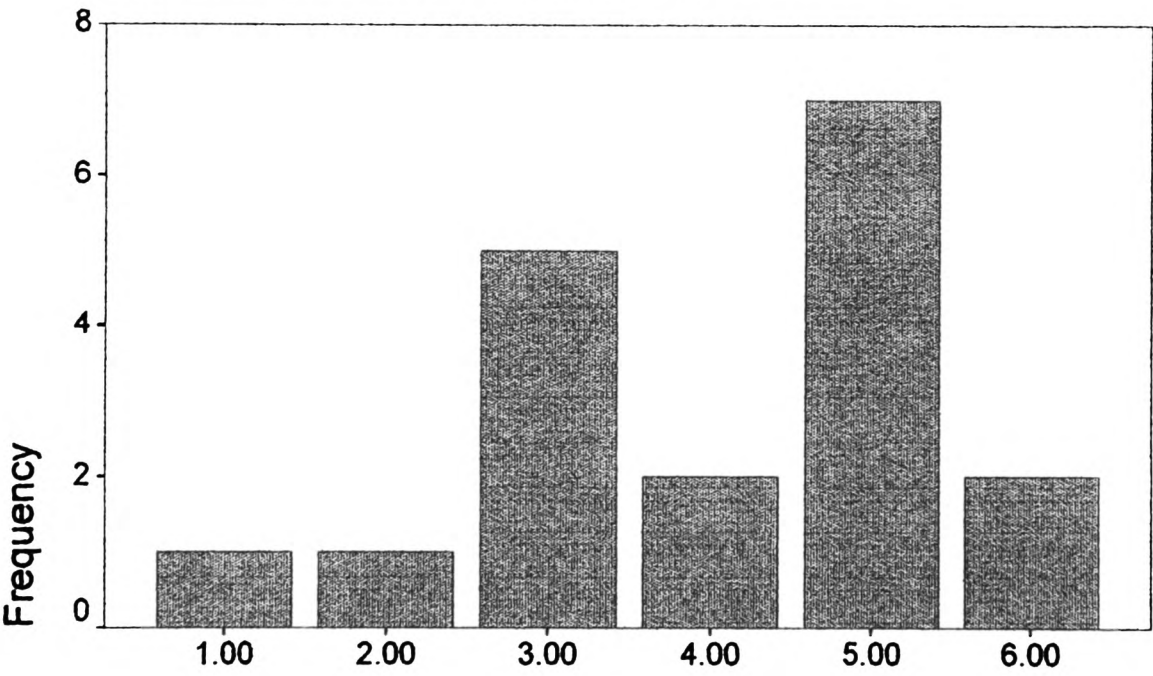
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q43

q44

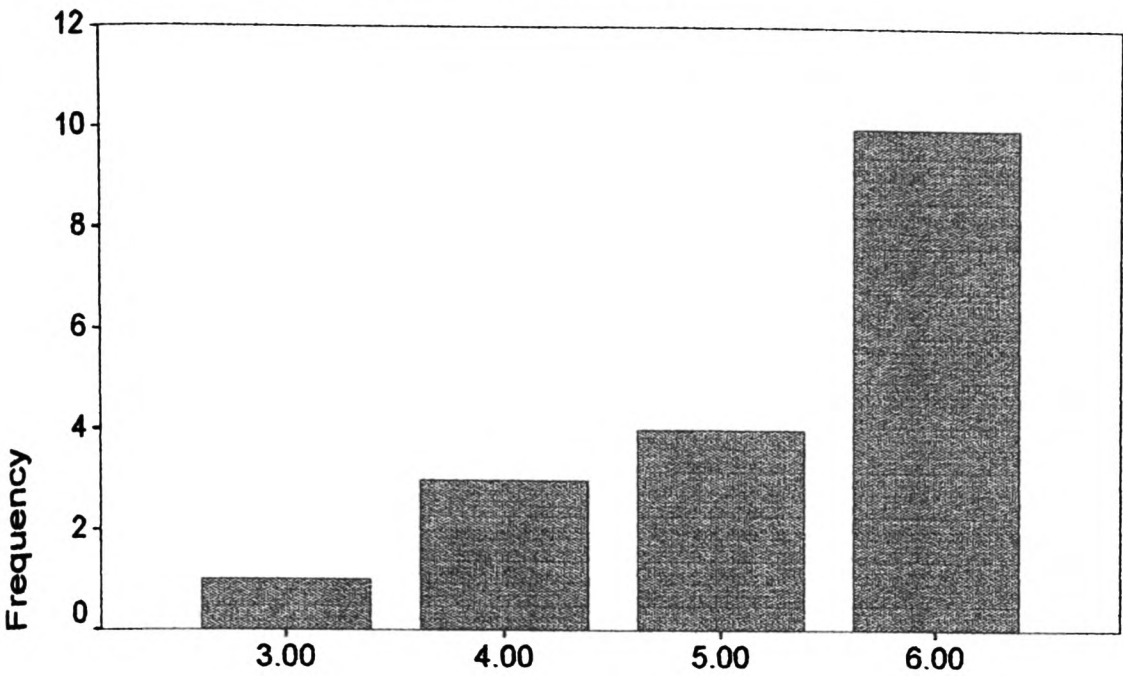
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q44

q45

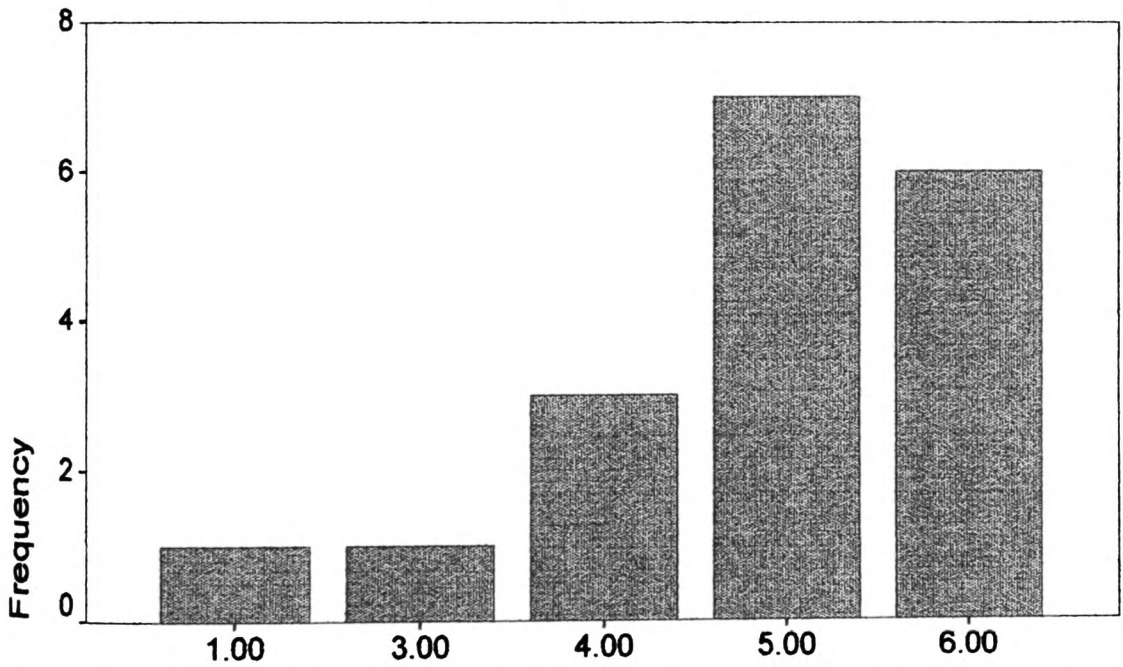
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q45

q46

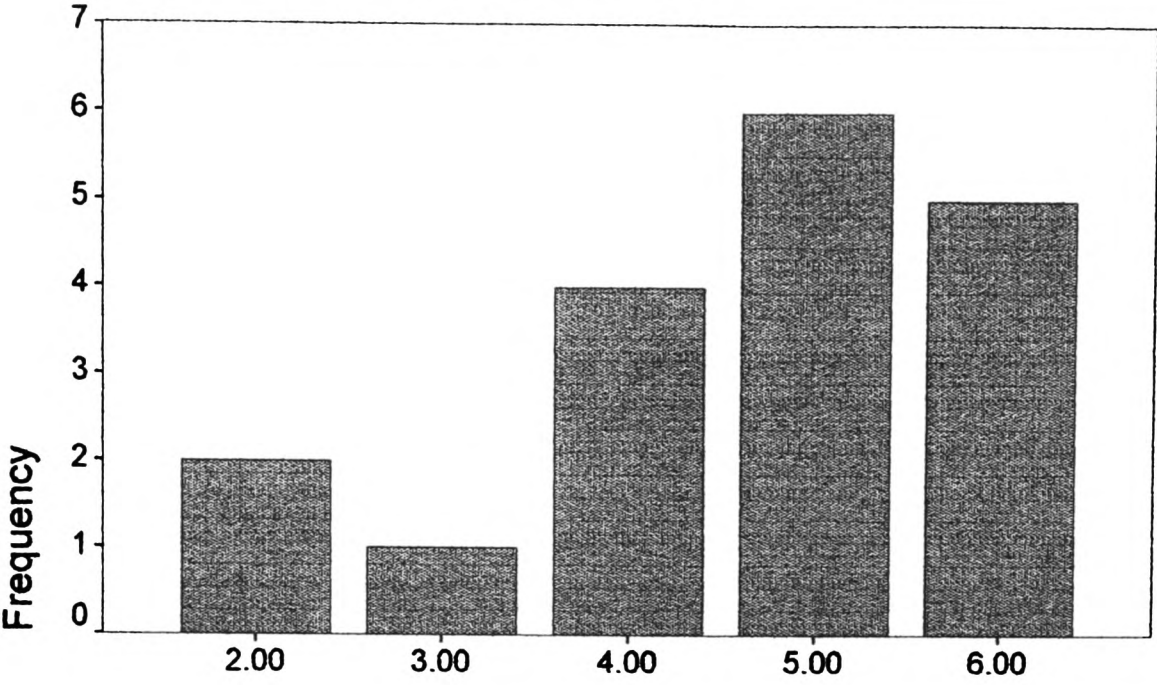
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q46

q47

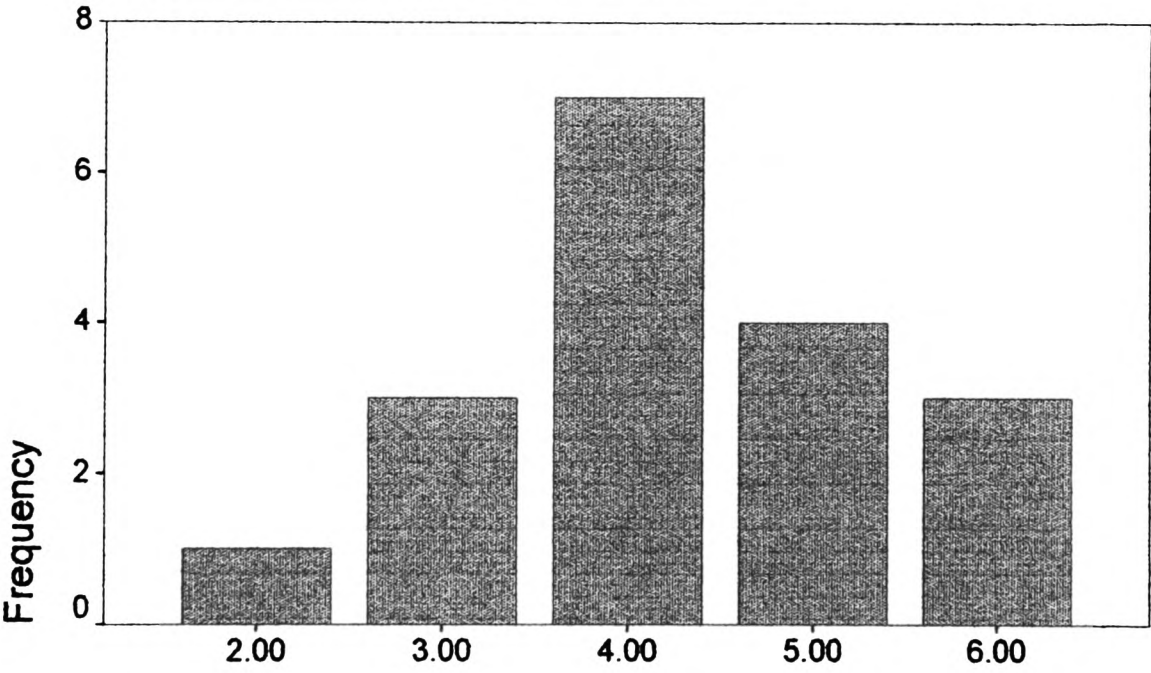
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q47

q48

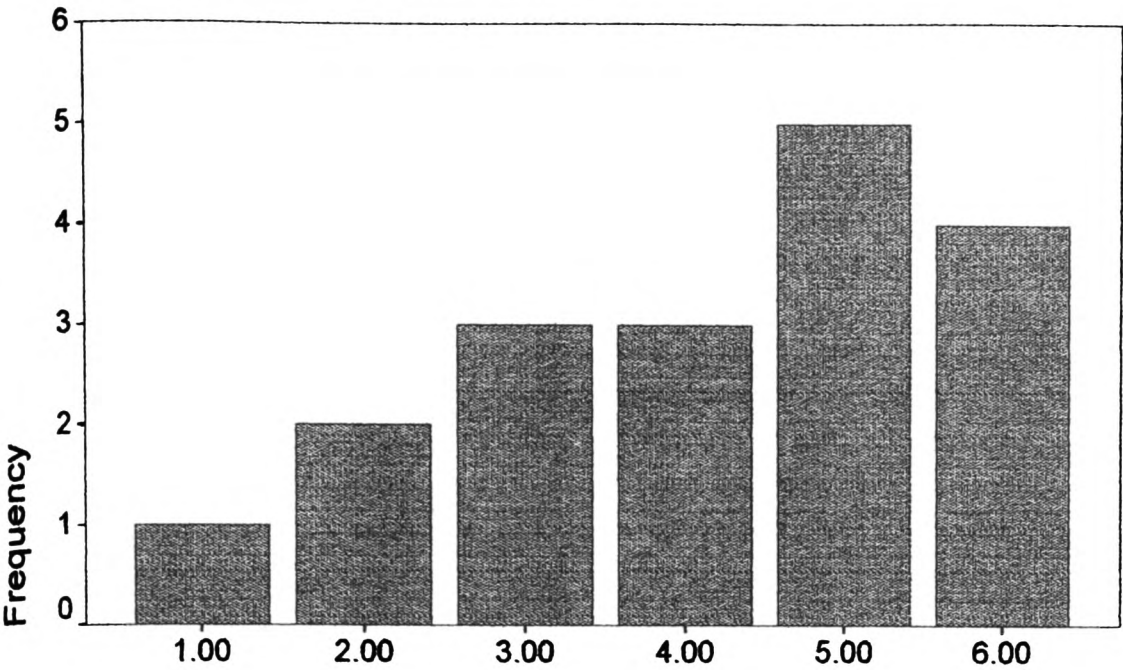
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q48

q49

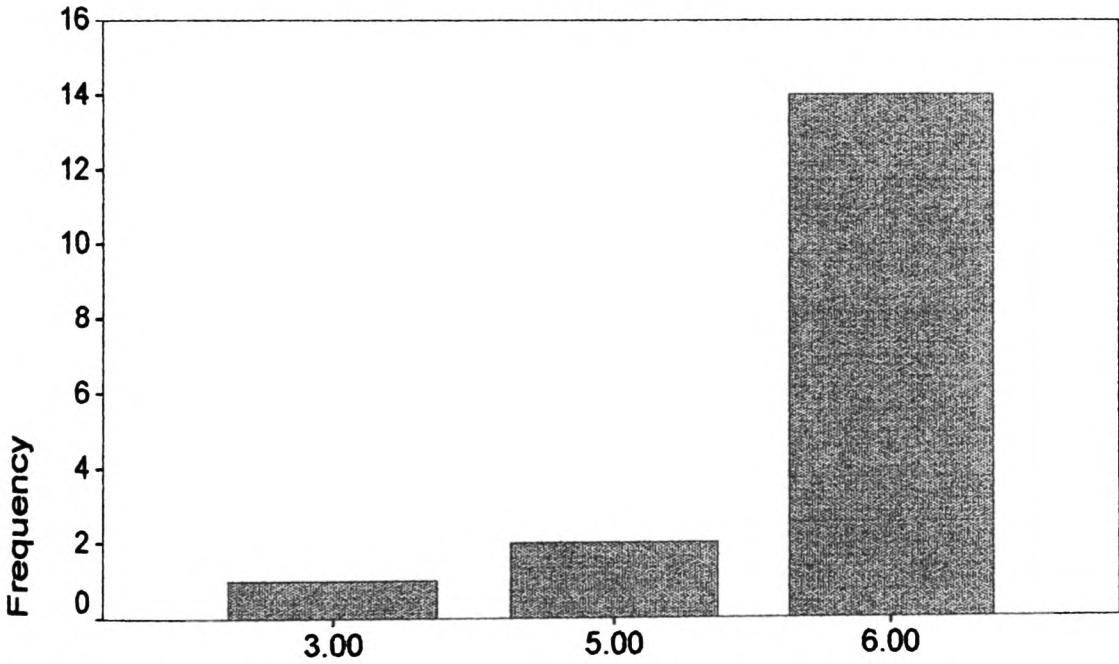
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q49

q50

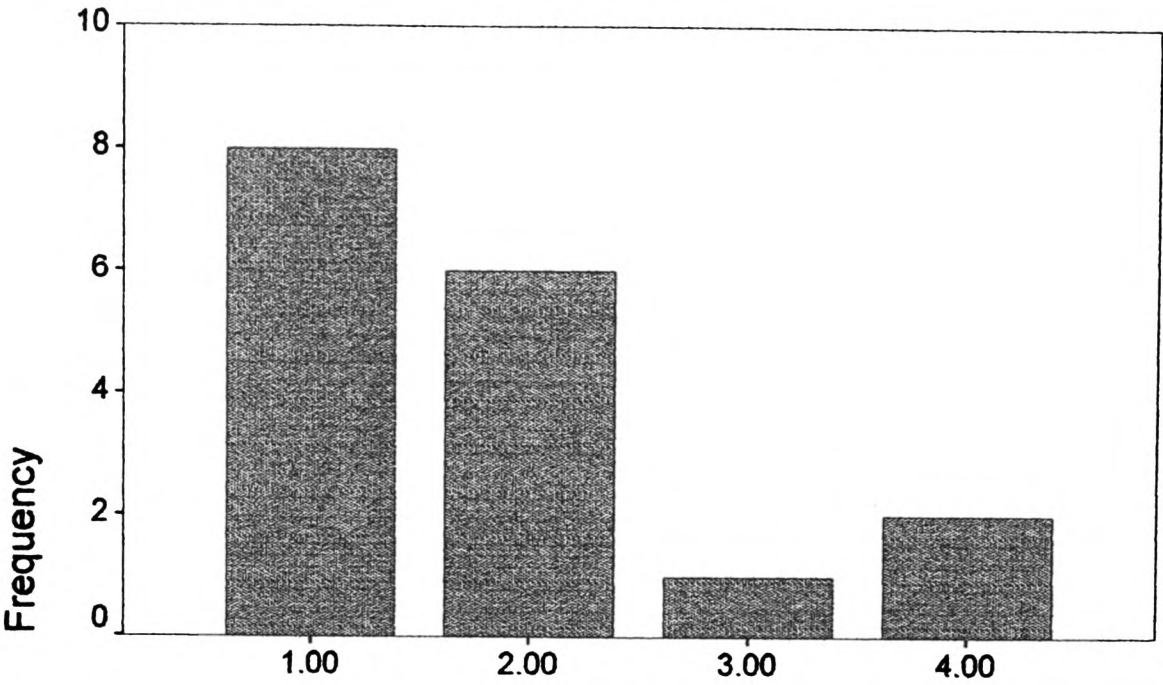
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q50

q51

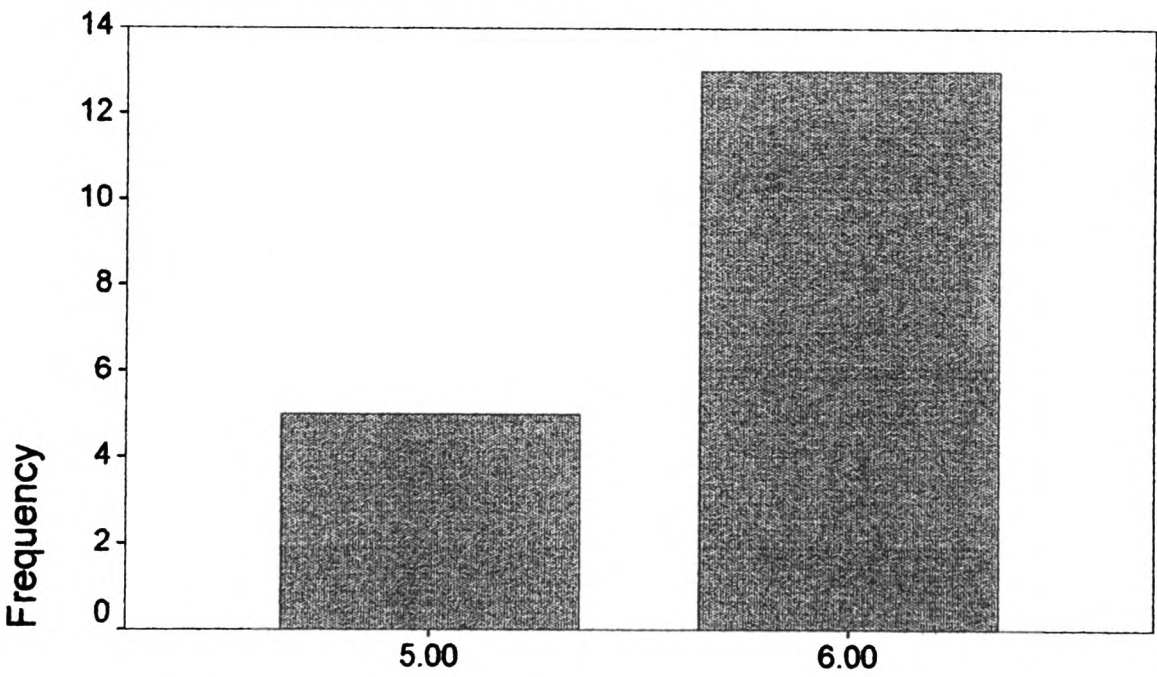
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q51

q52

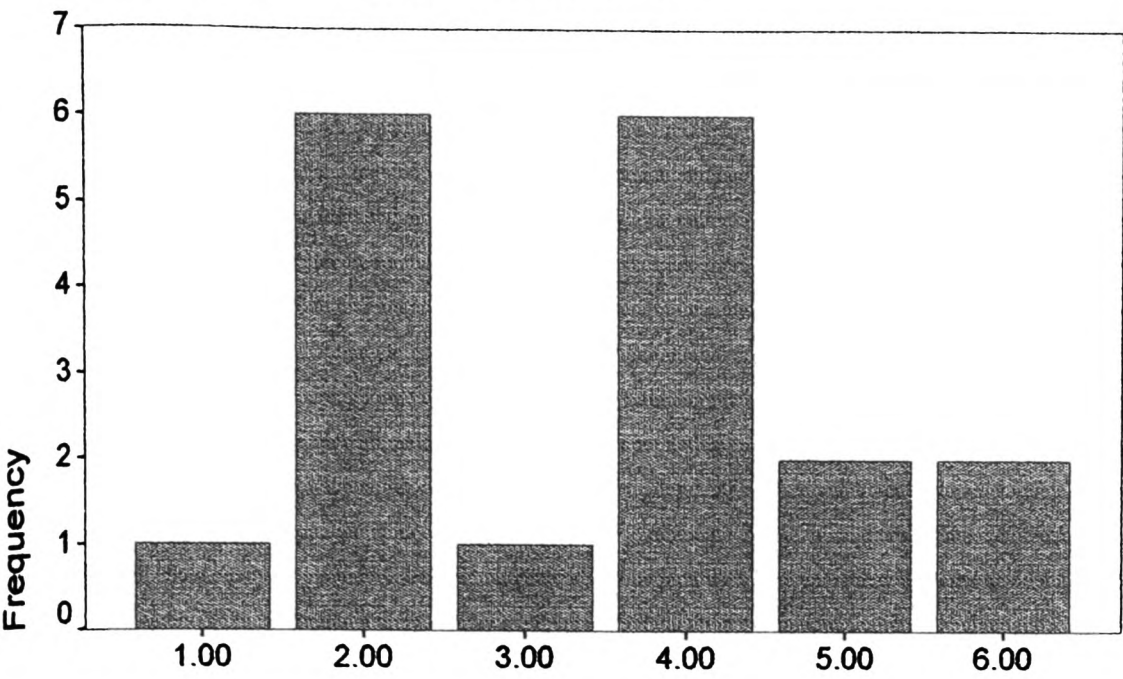
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q52

q53

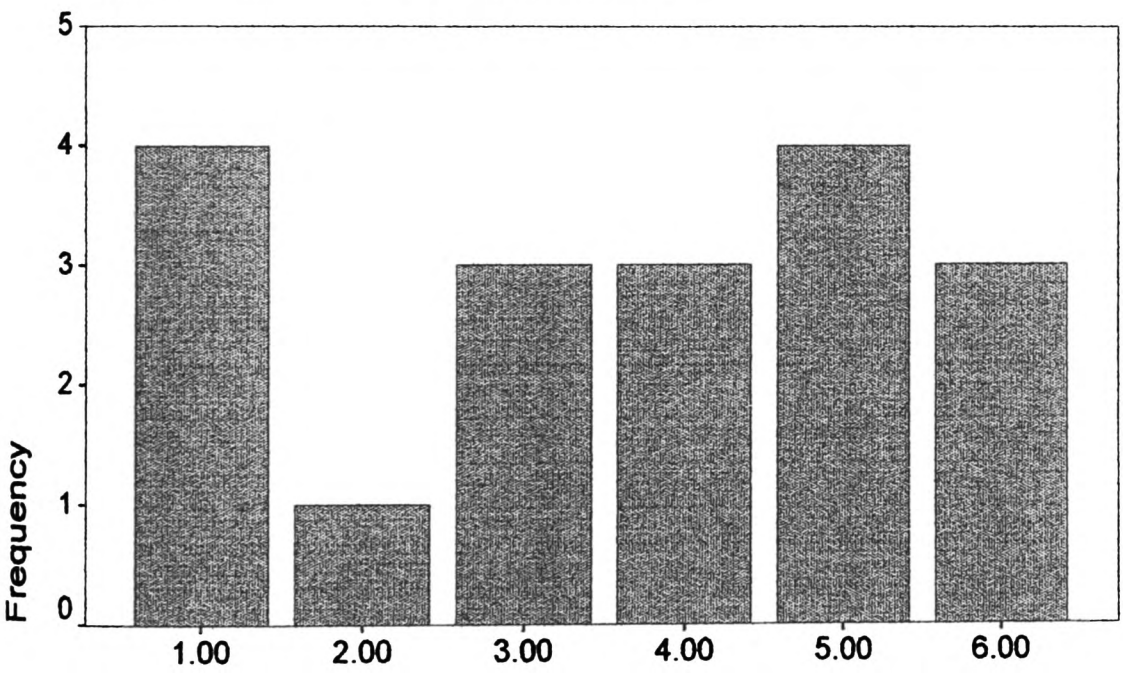
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q53

q54

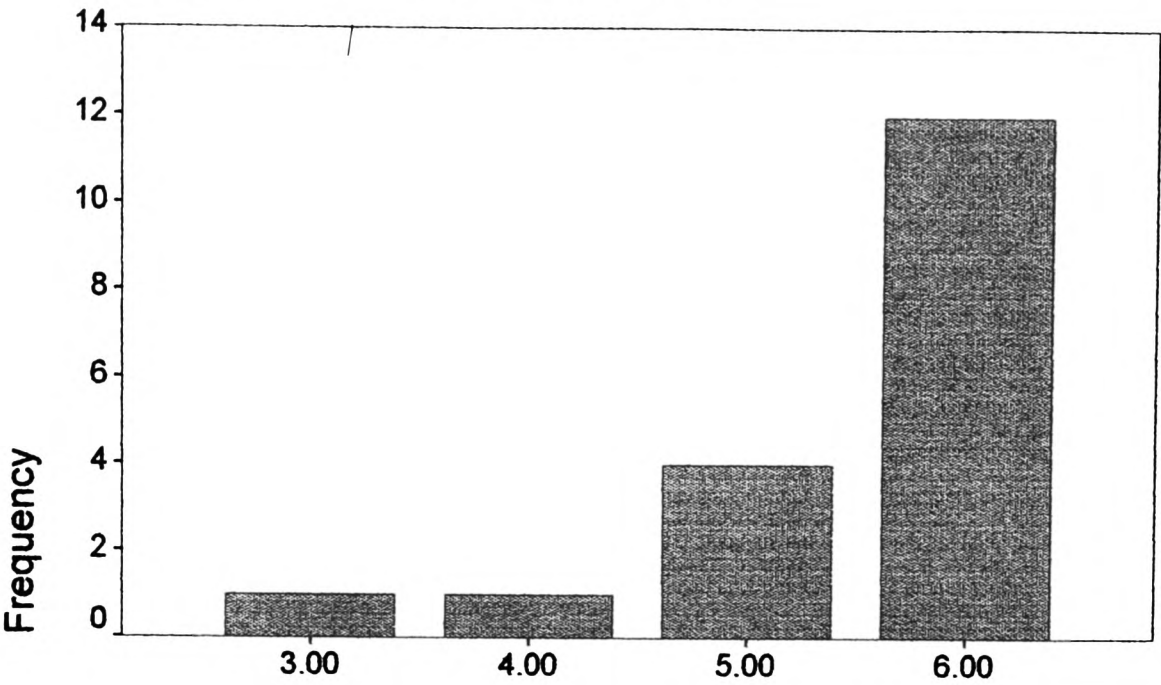
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q54

q55

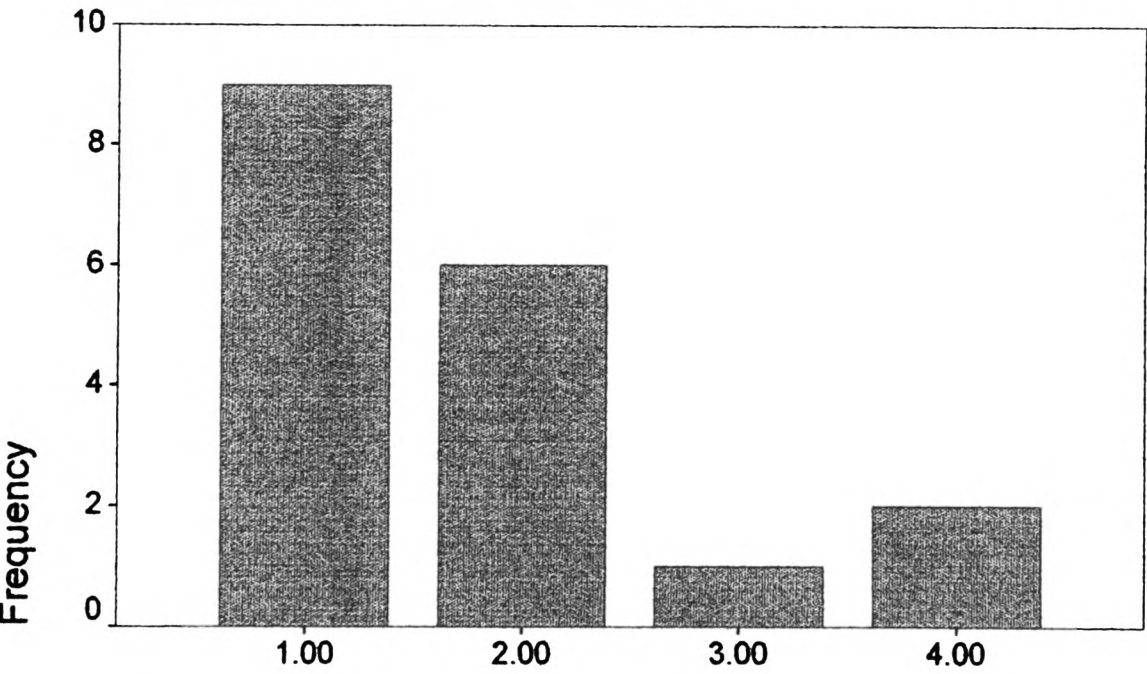
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q55

q56

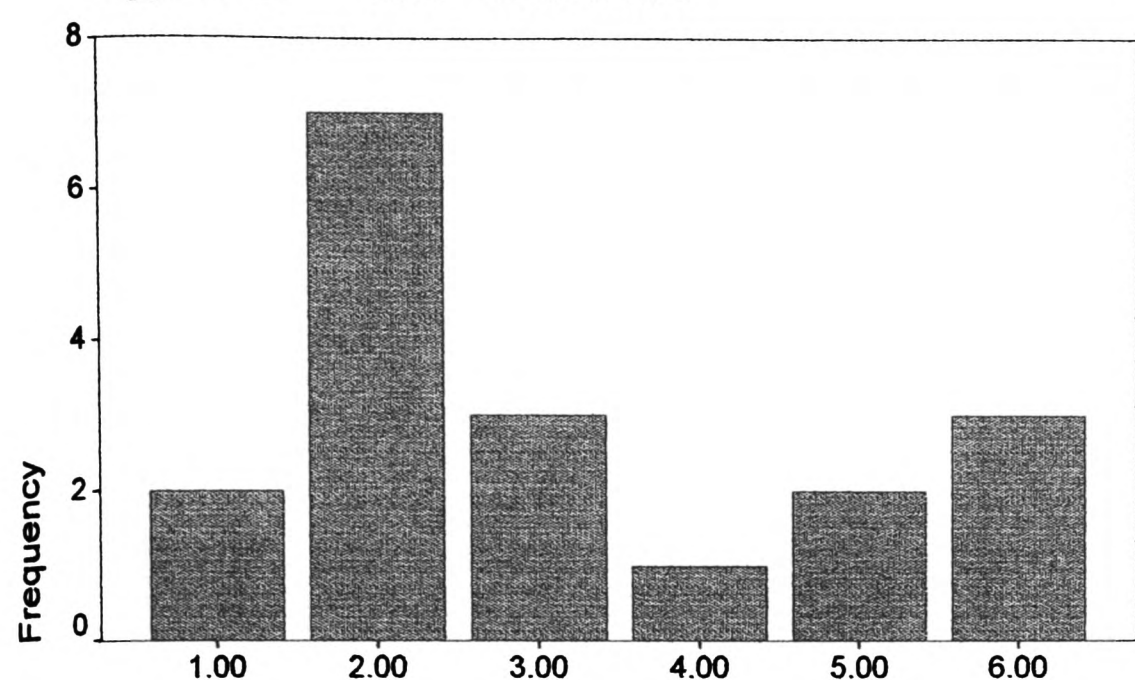
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q56

q57

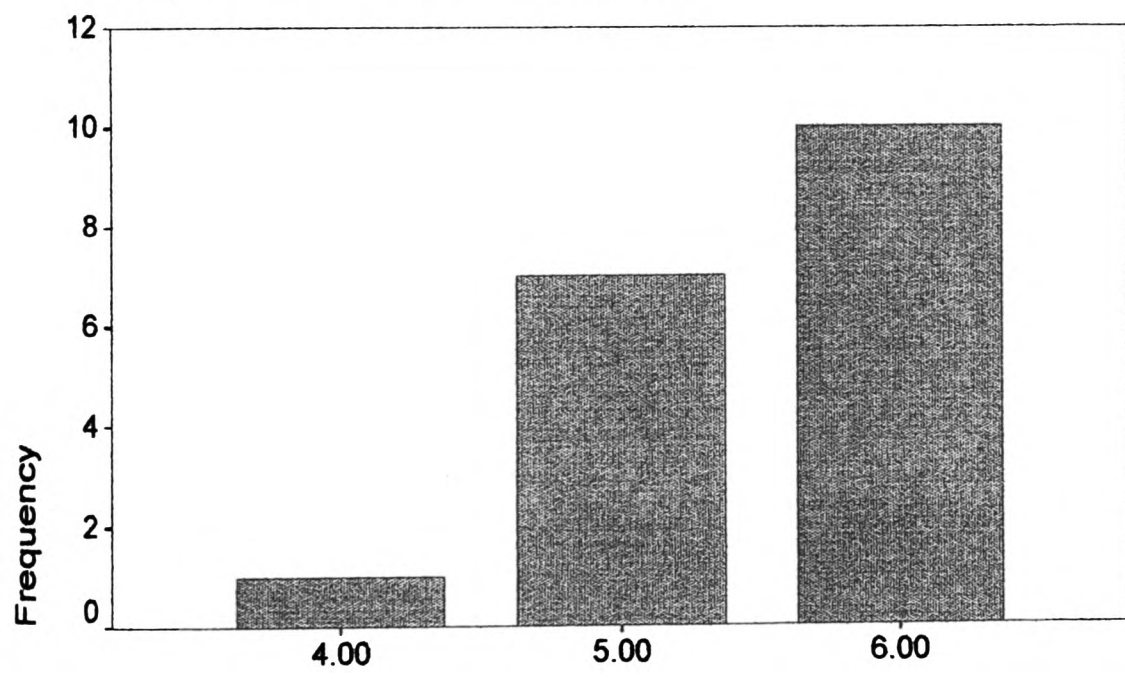
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q57

q58

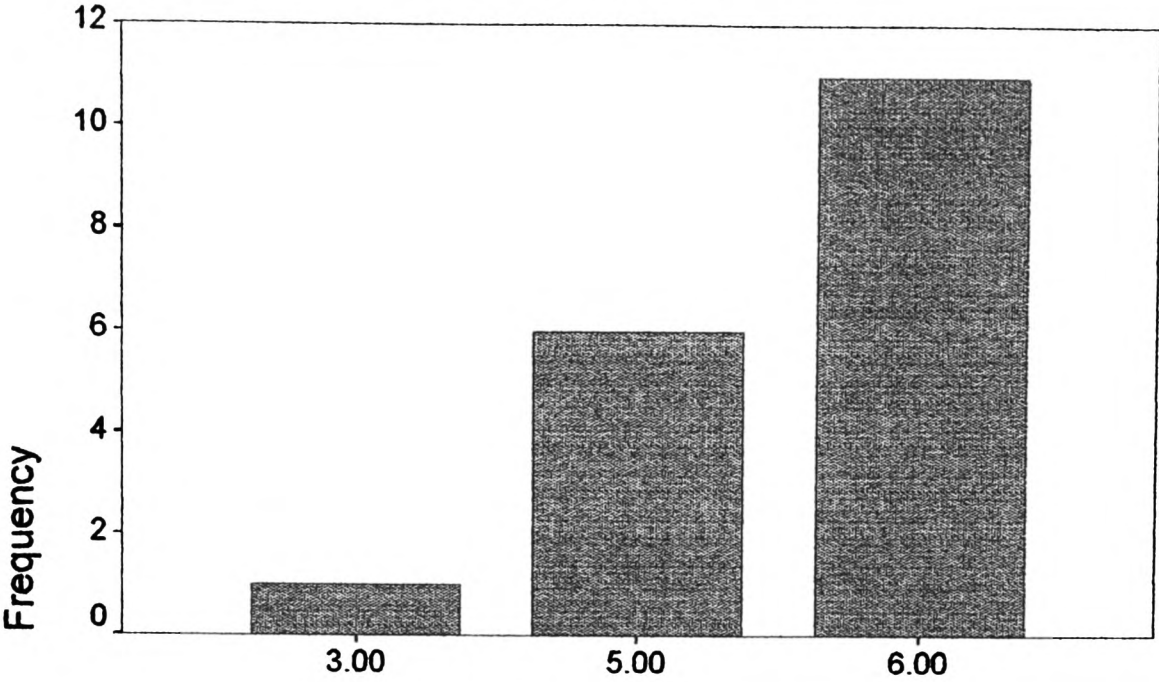
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q58

q59

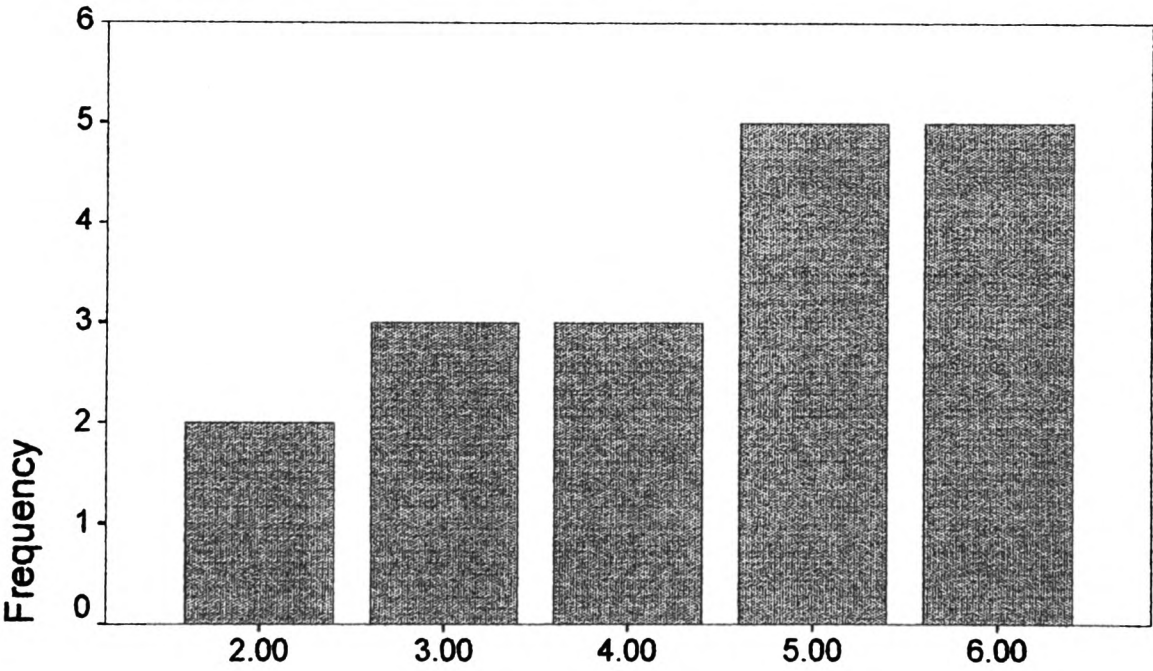
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q59

q60

Q_TYPE: 3.00 Delaware

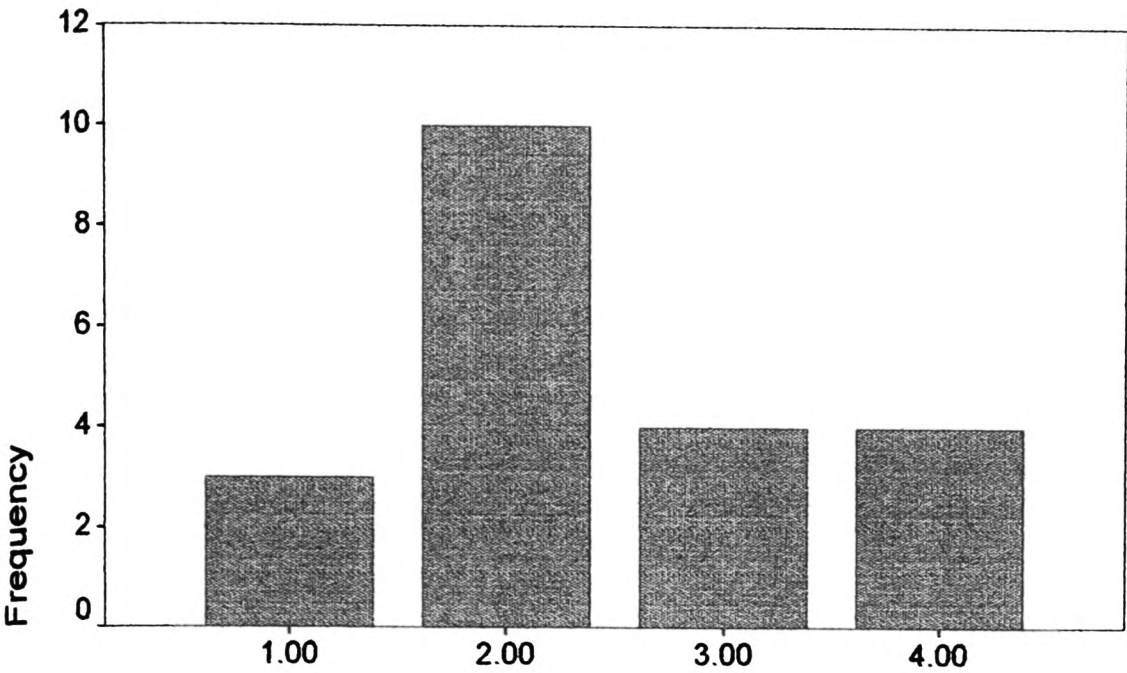


q60

Bar Chart

q1

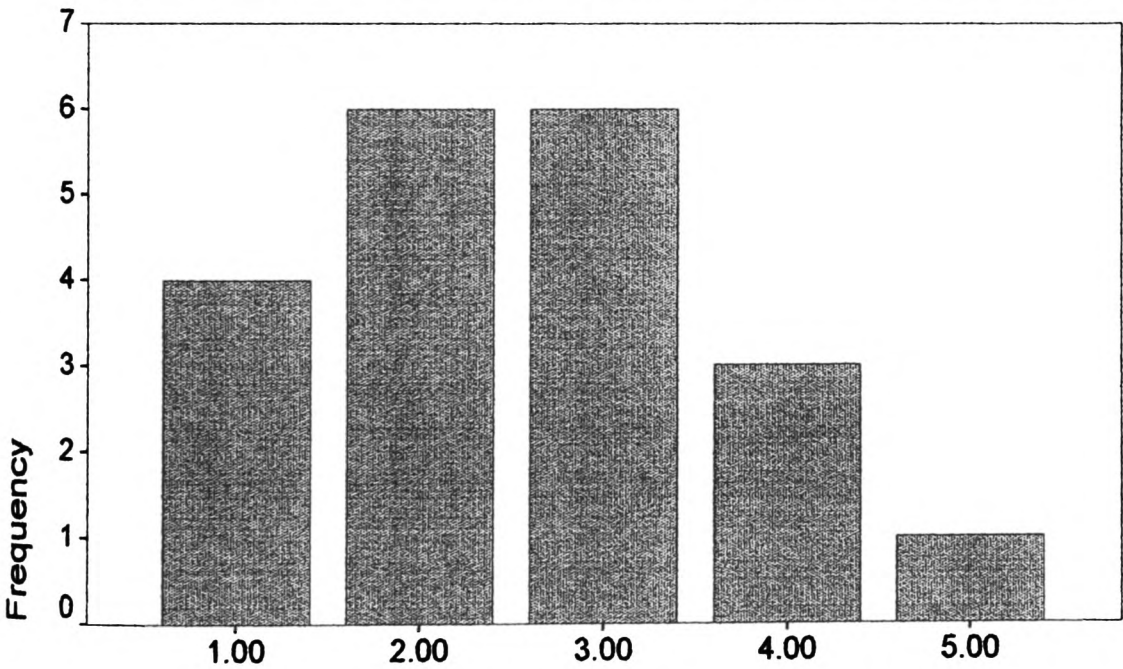
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q1

q2

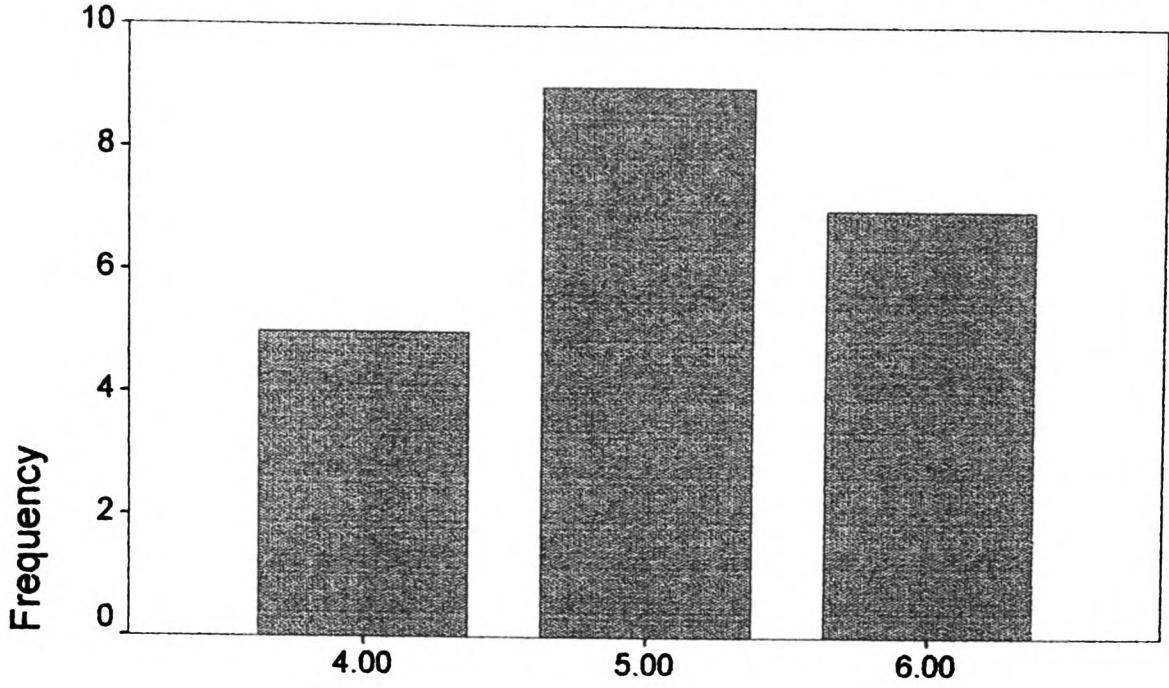
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q2

q3

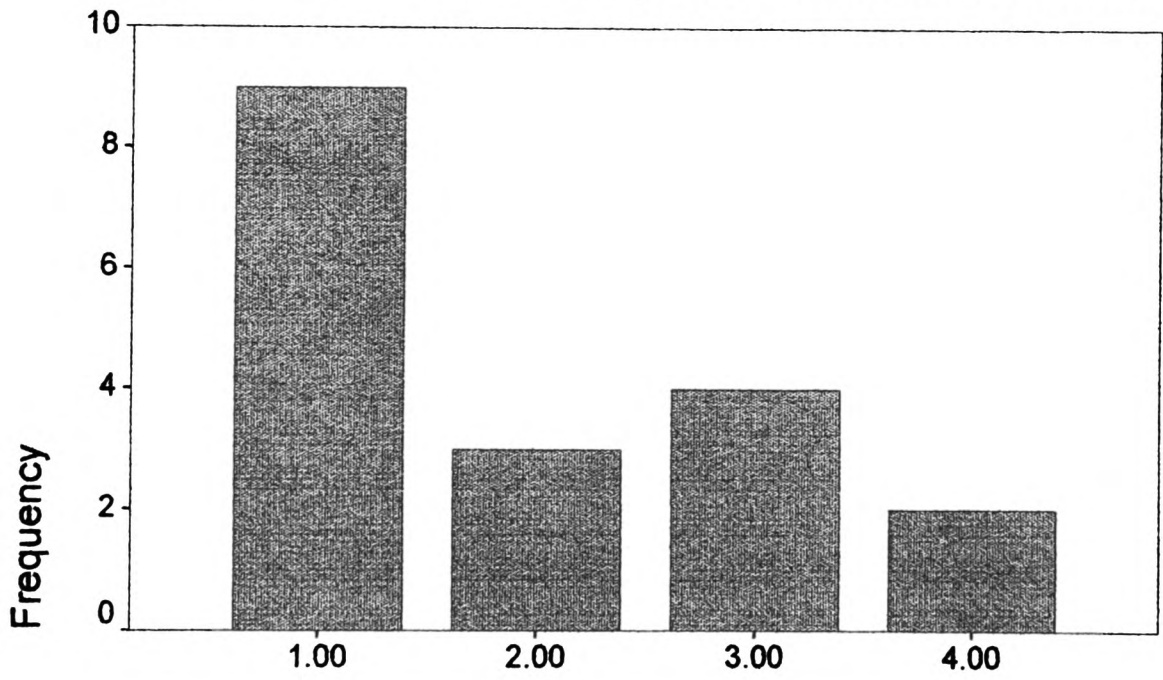
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q3

q4

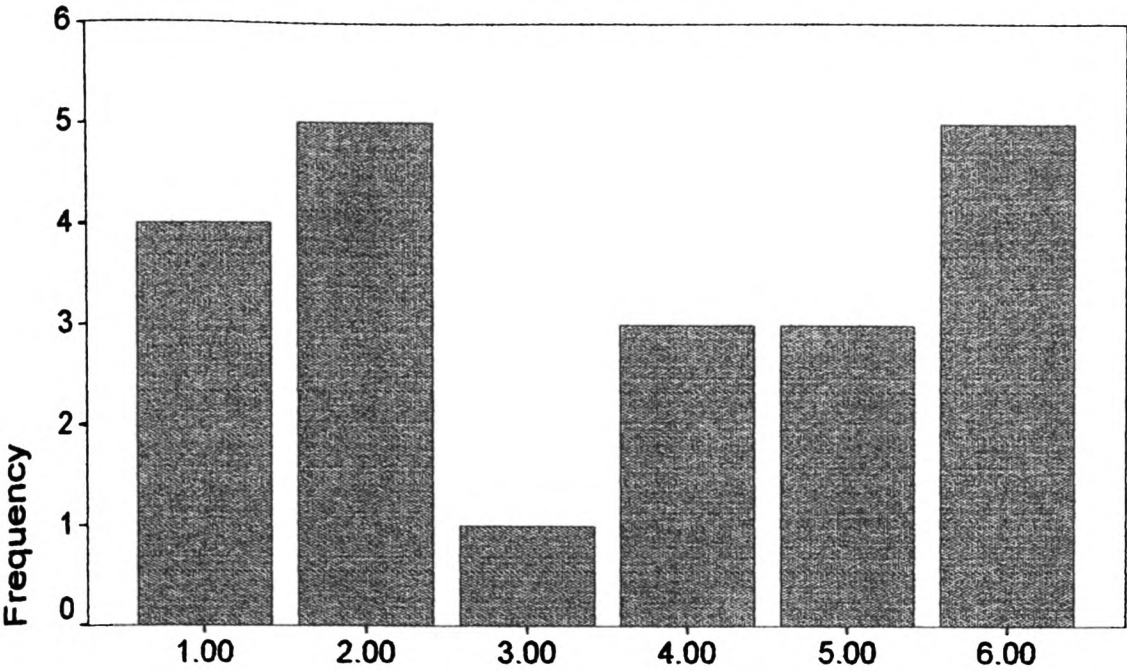
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q4

q5

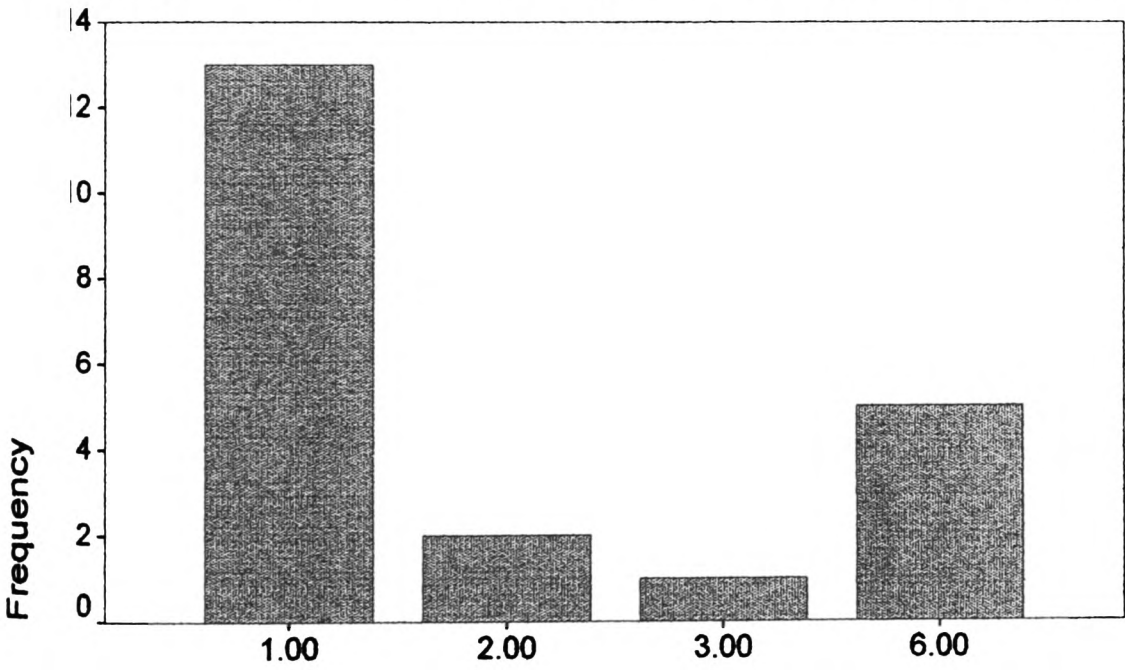
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q5

q6

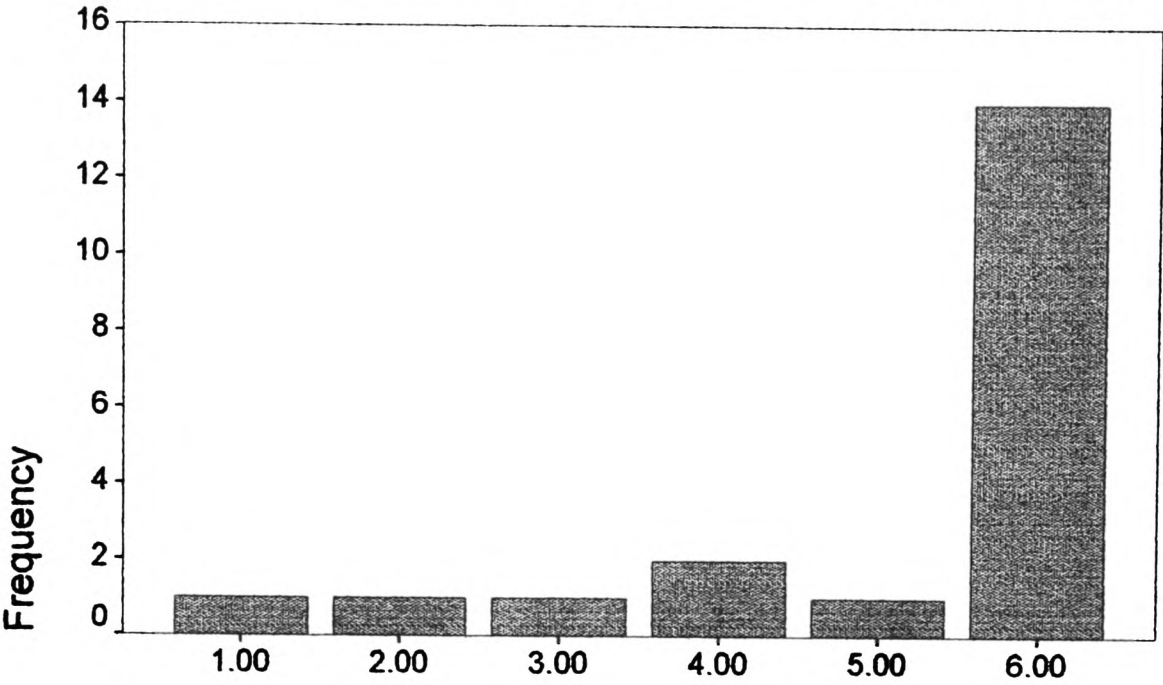
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q6

q7

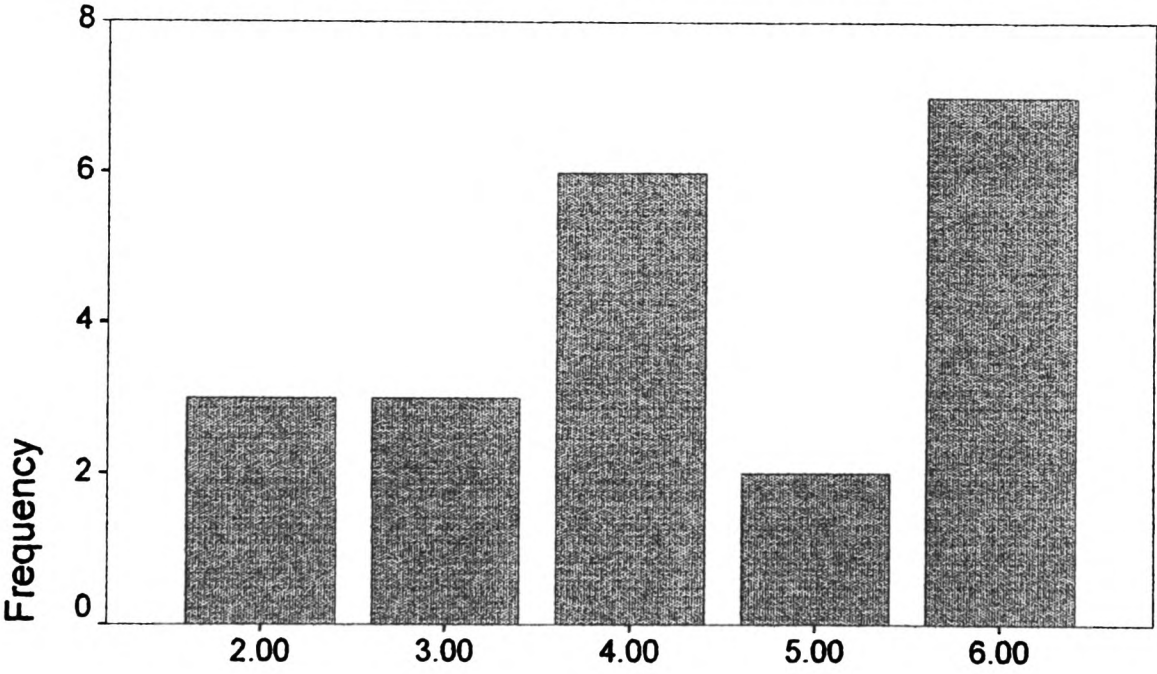
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q7

q8

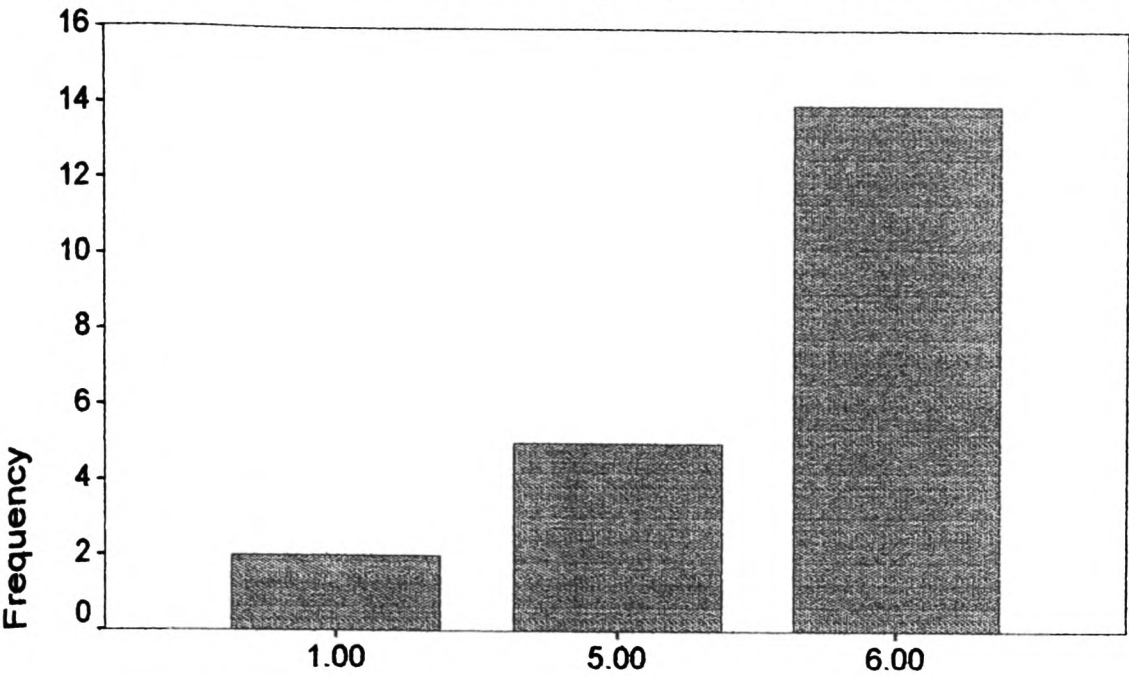
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q8

q9

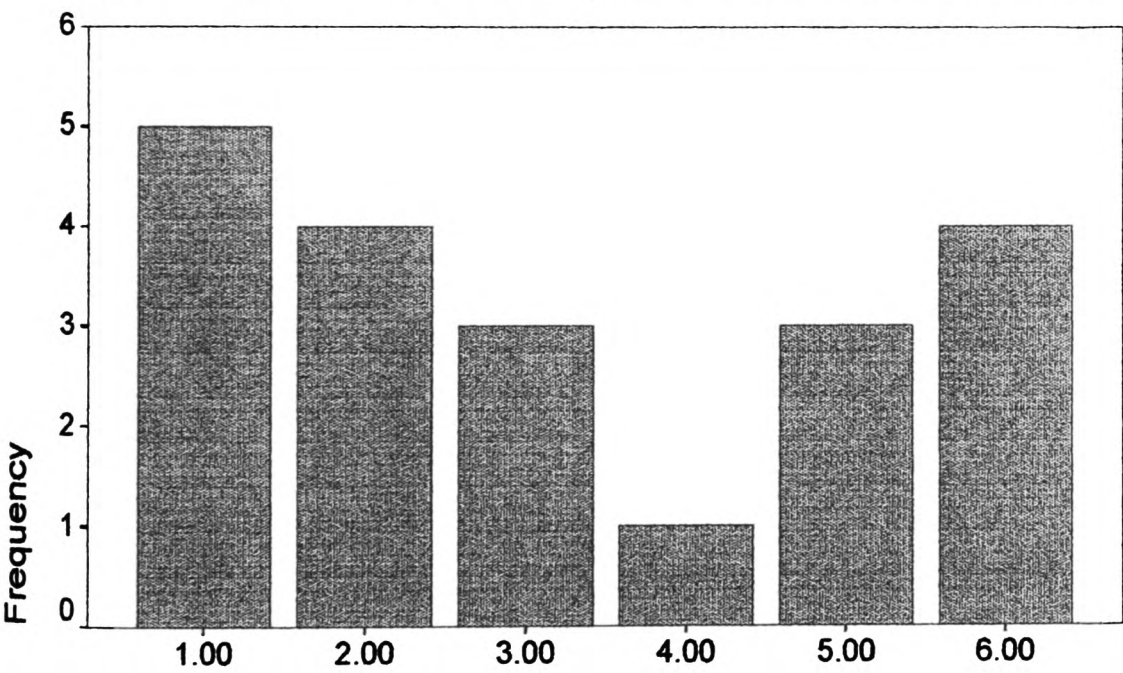
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q9

q10

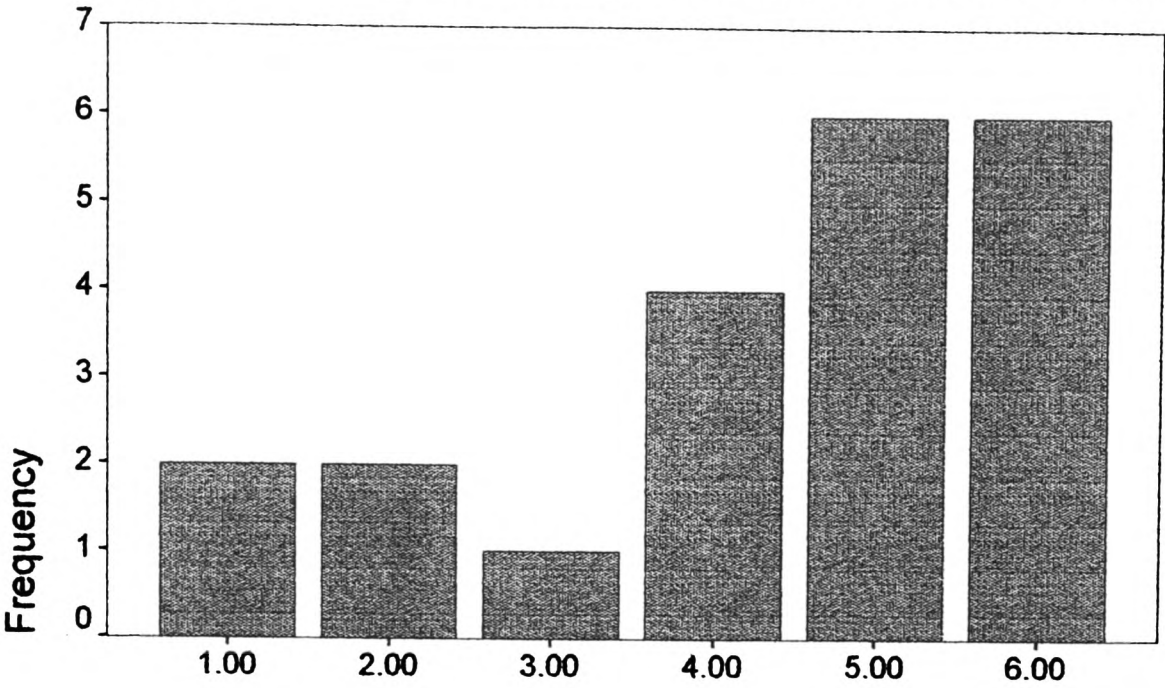
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q10

q11

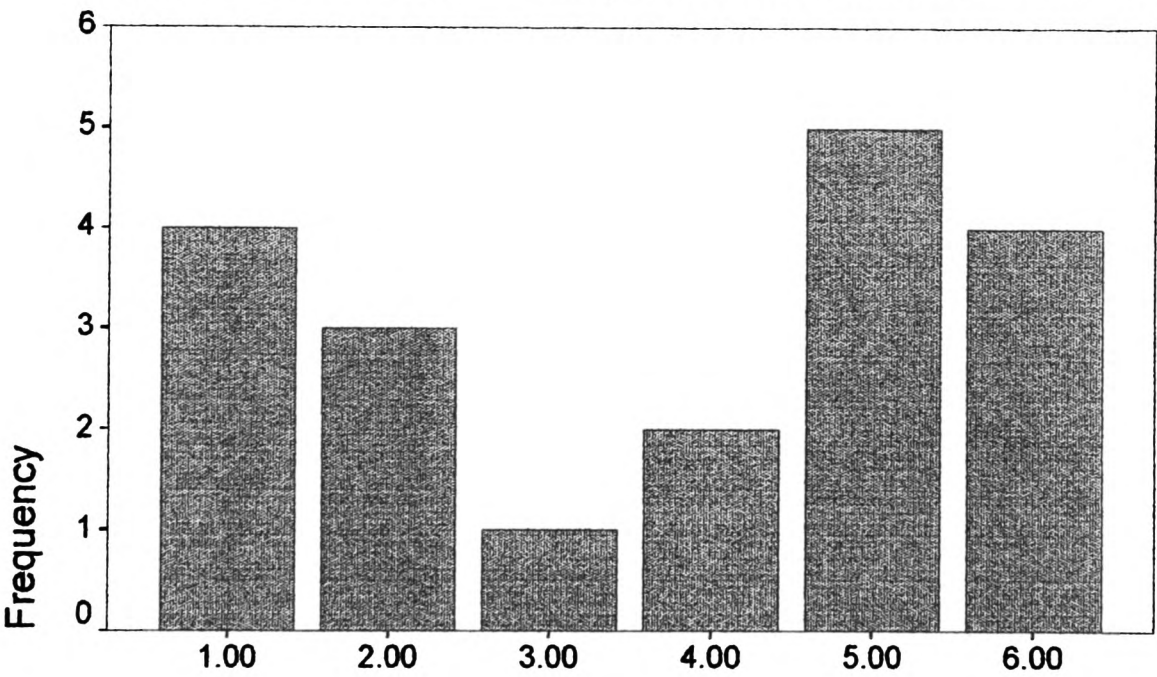
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q11

q12

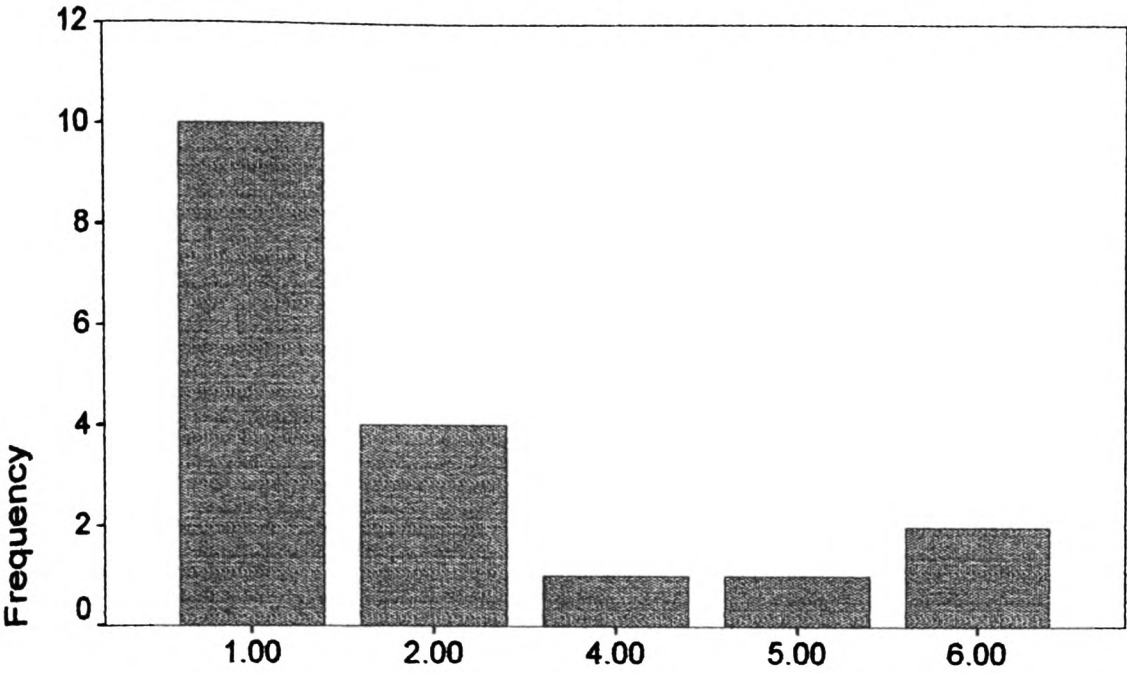
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q12

q13

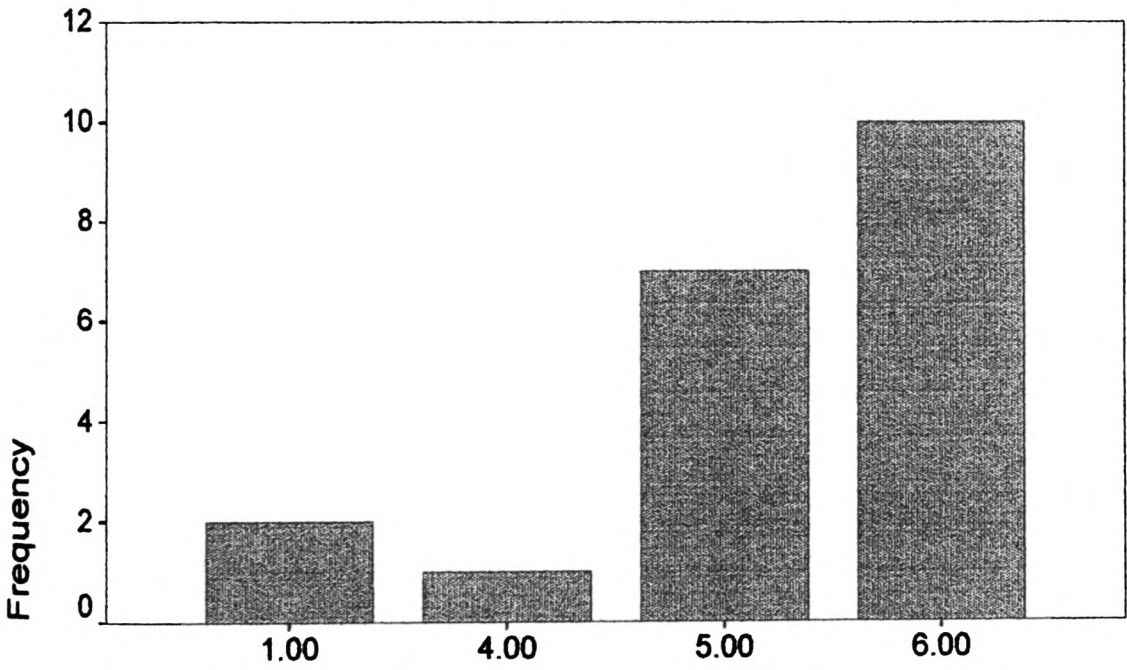
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q13

q14

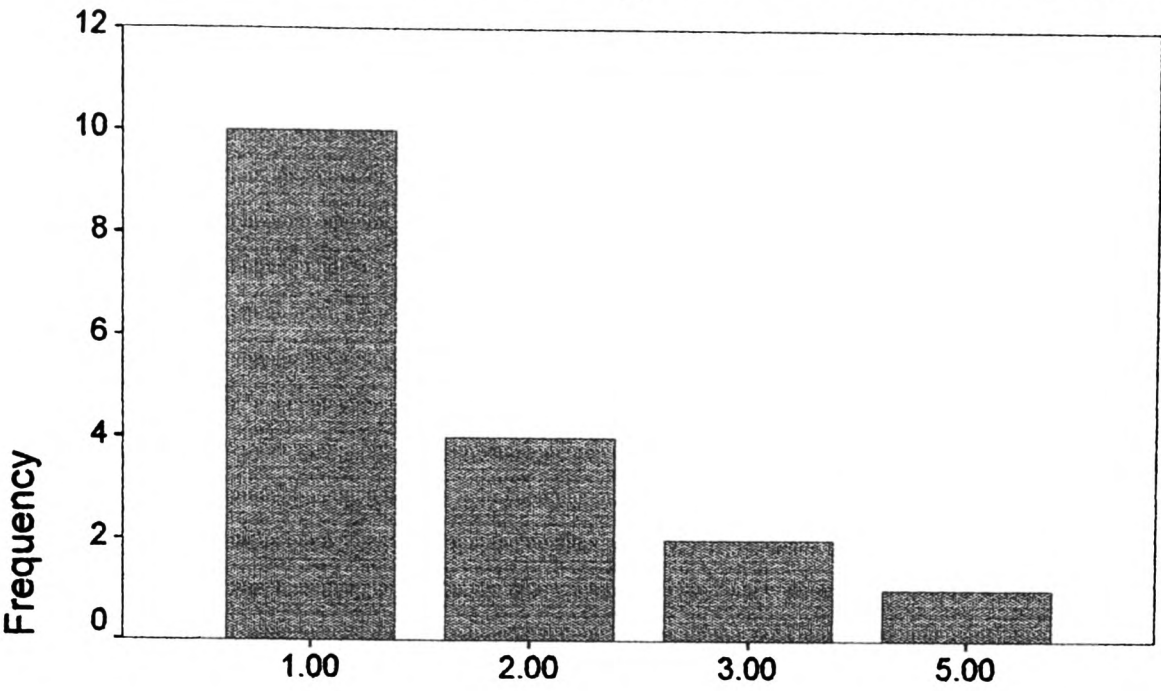
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q14

q15

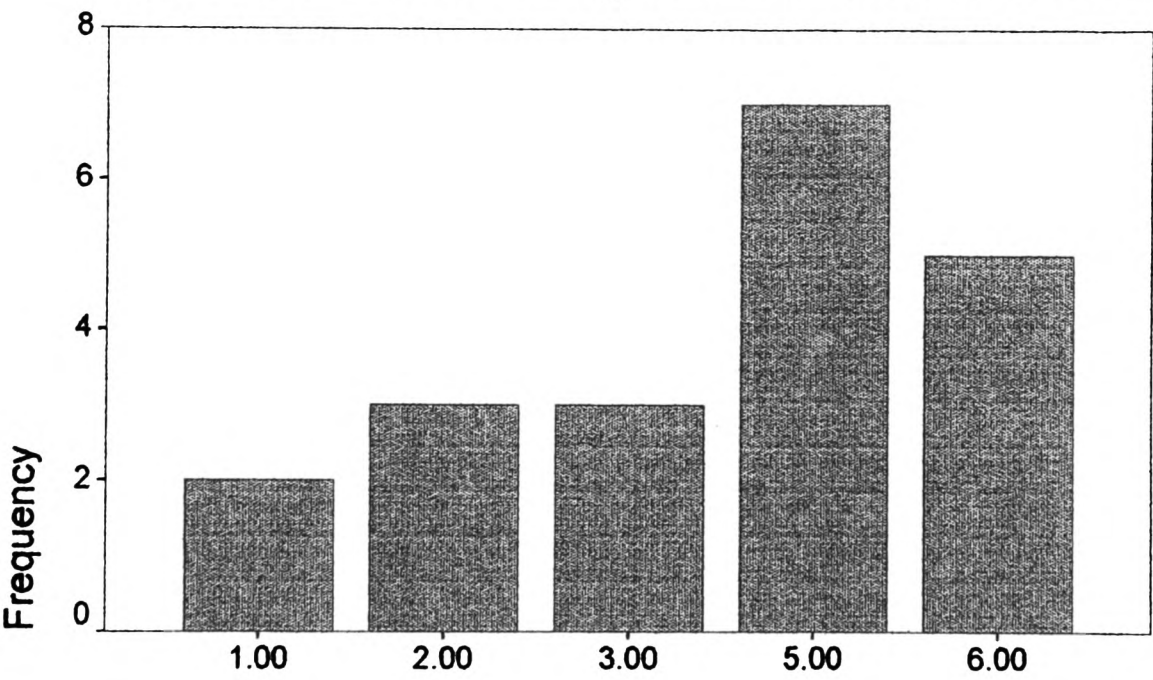
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q15

q16

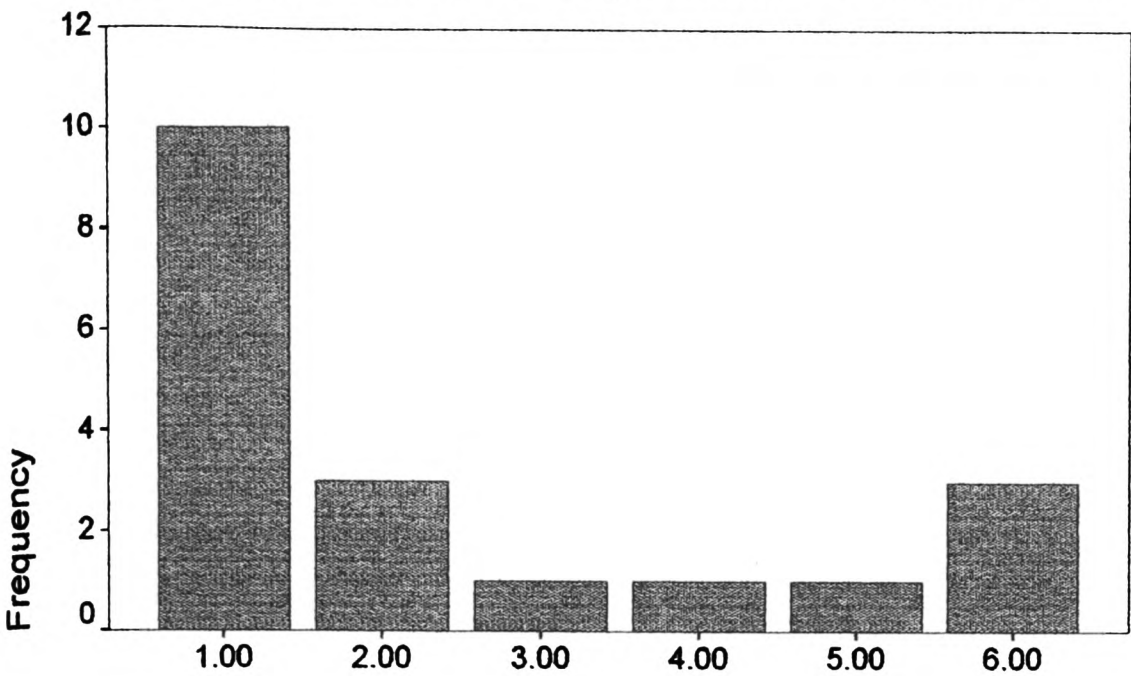
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q16

q17

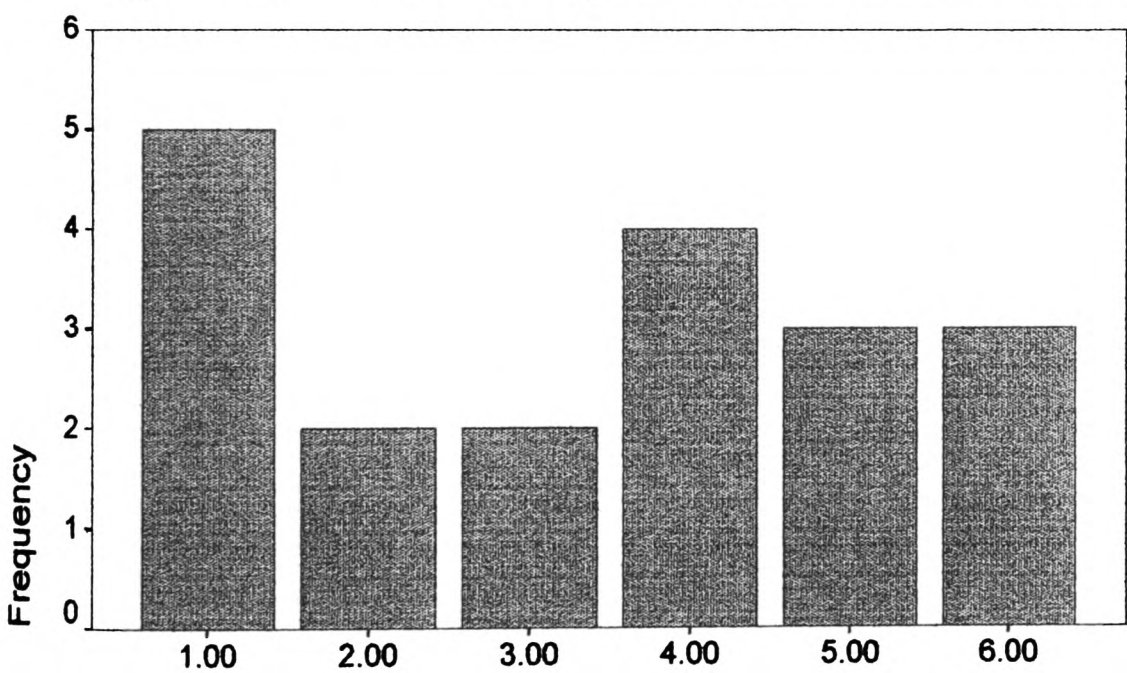
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q17

q18

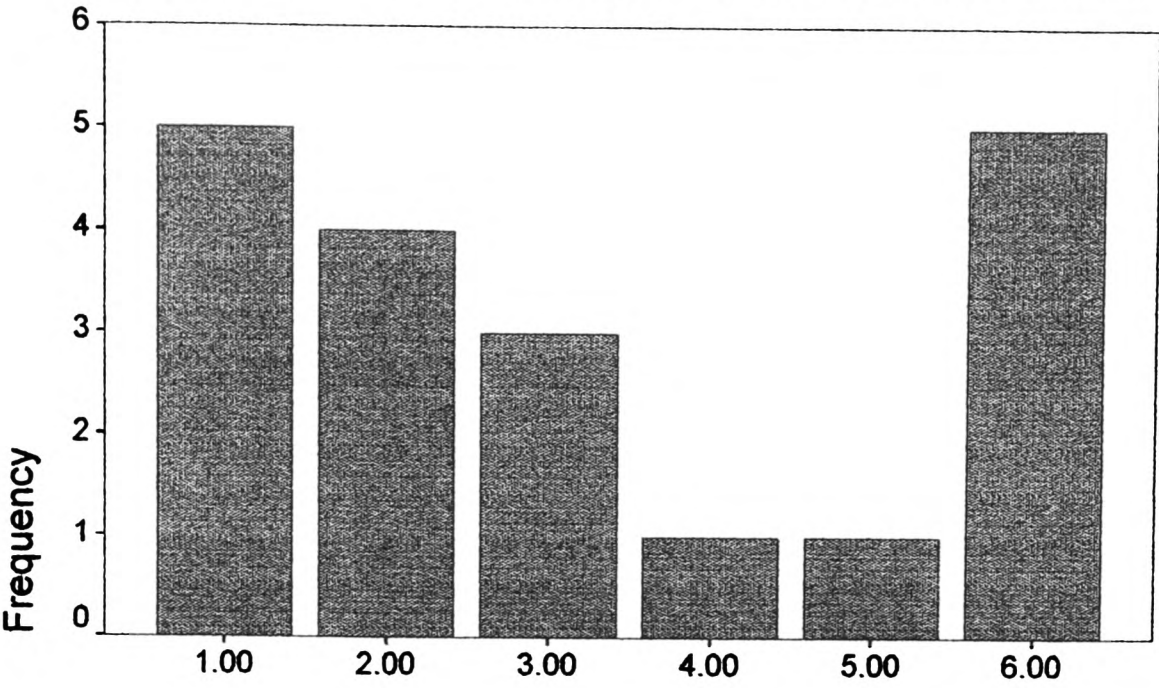
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q18

q19

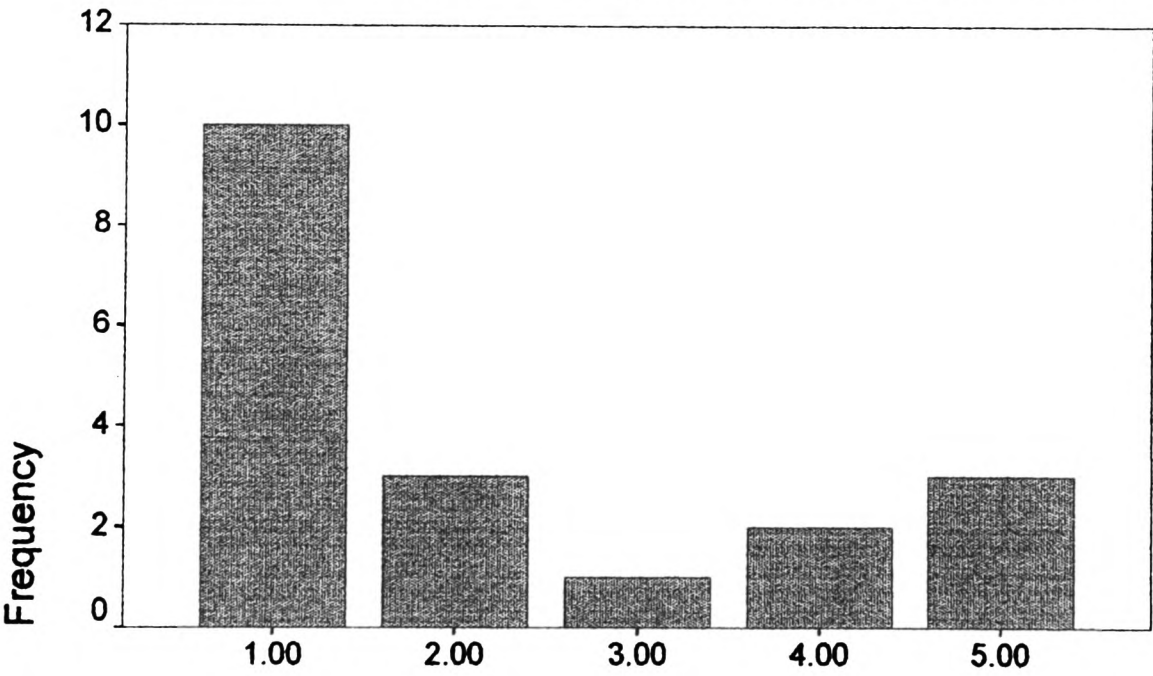
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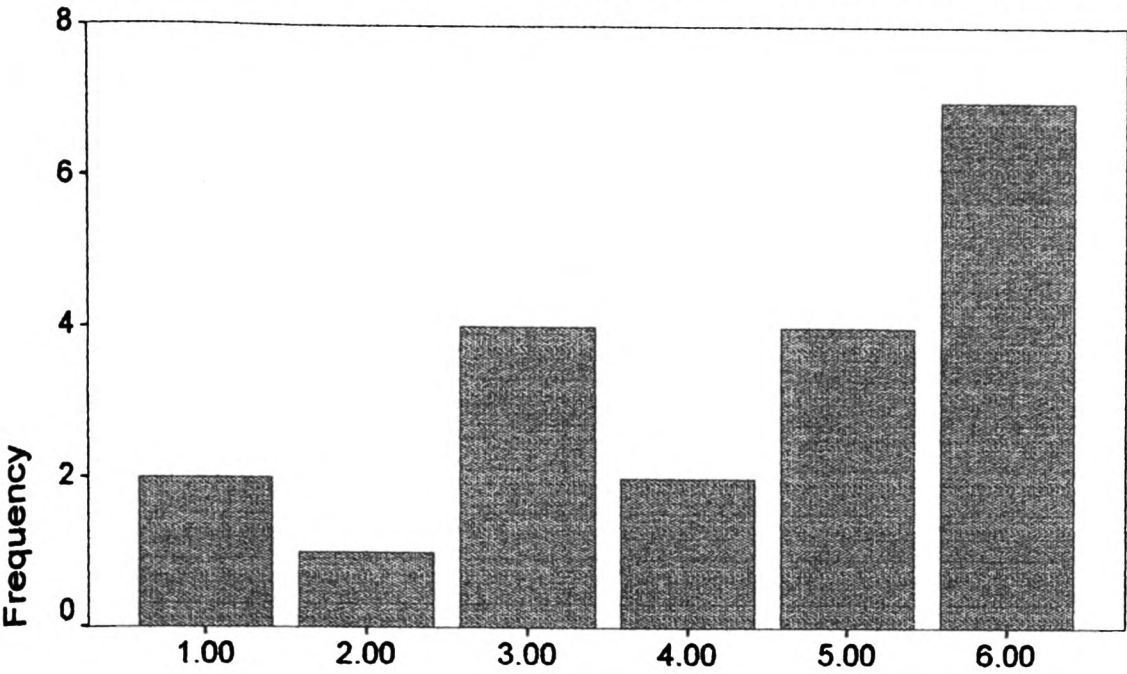
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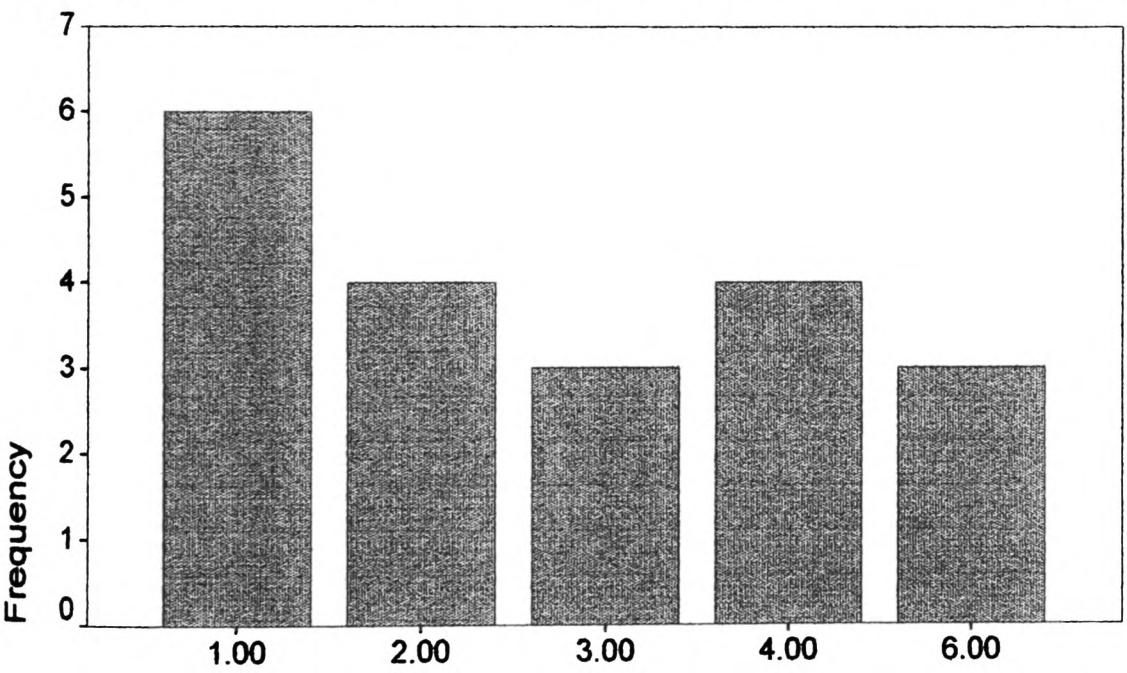
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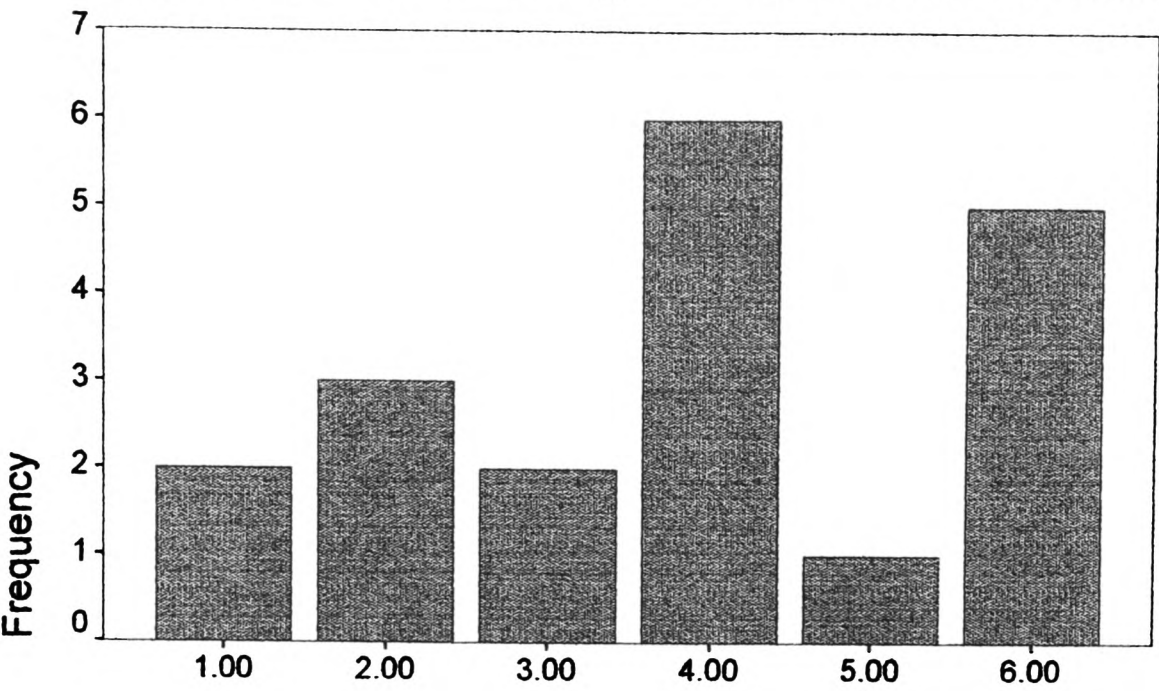
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q22

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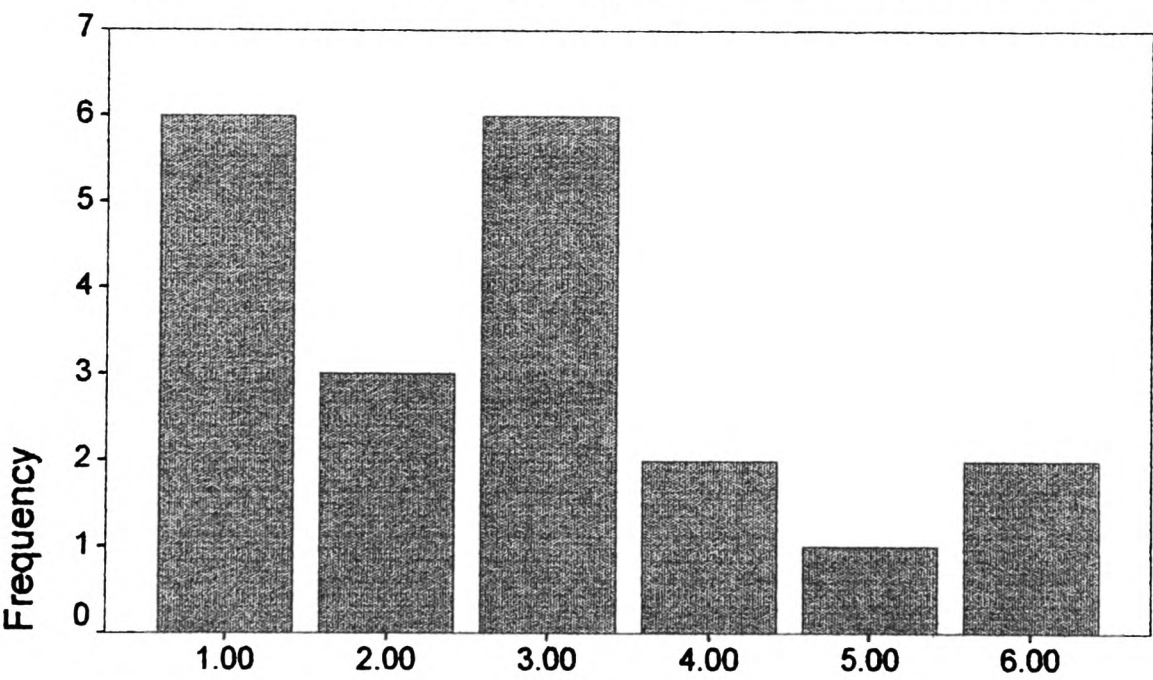
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q23

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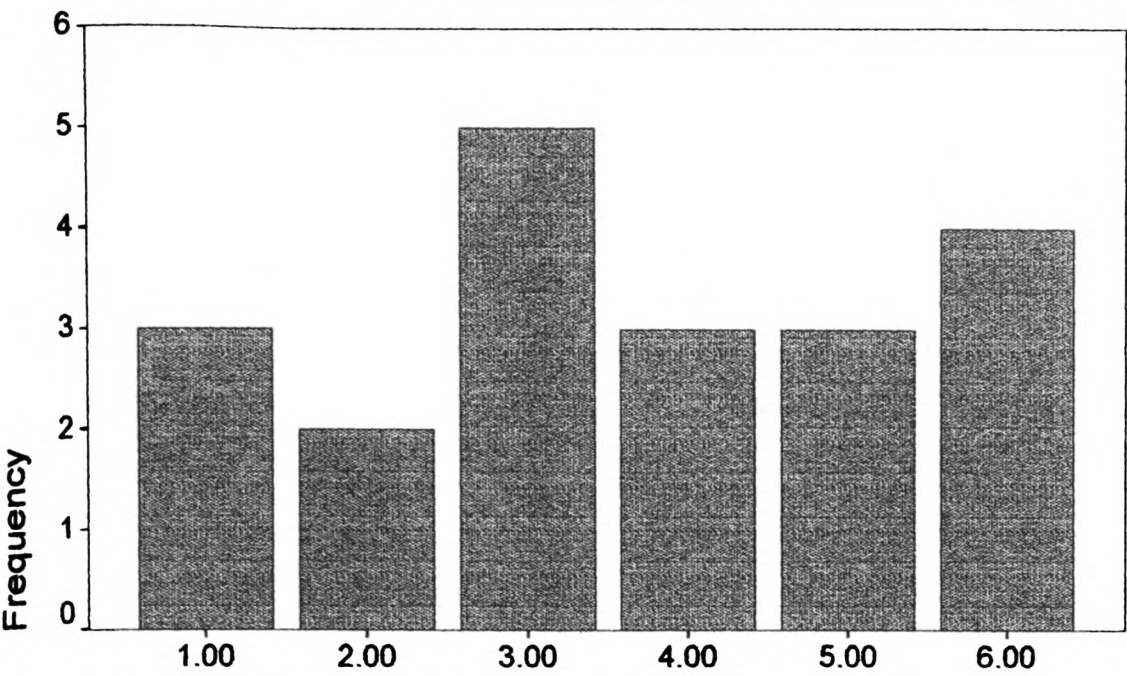
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q24

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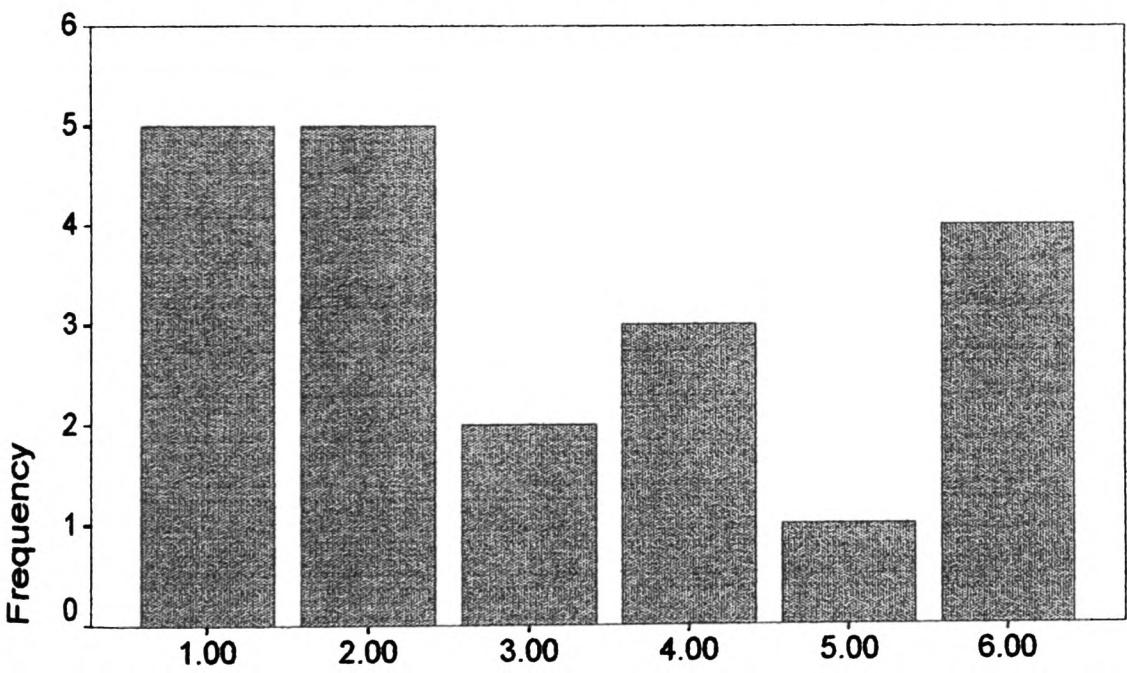
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q25

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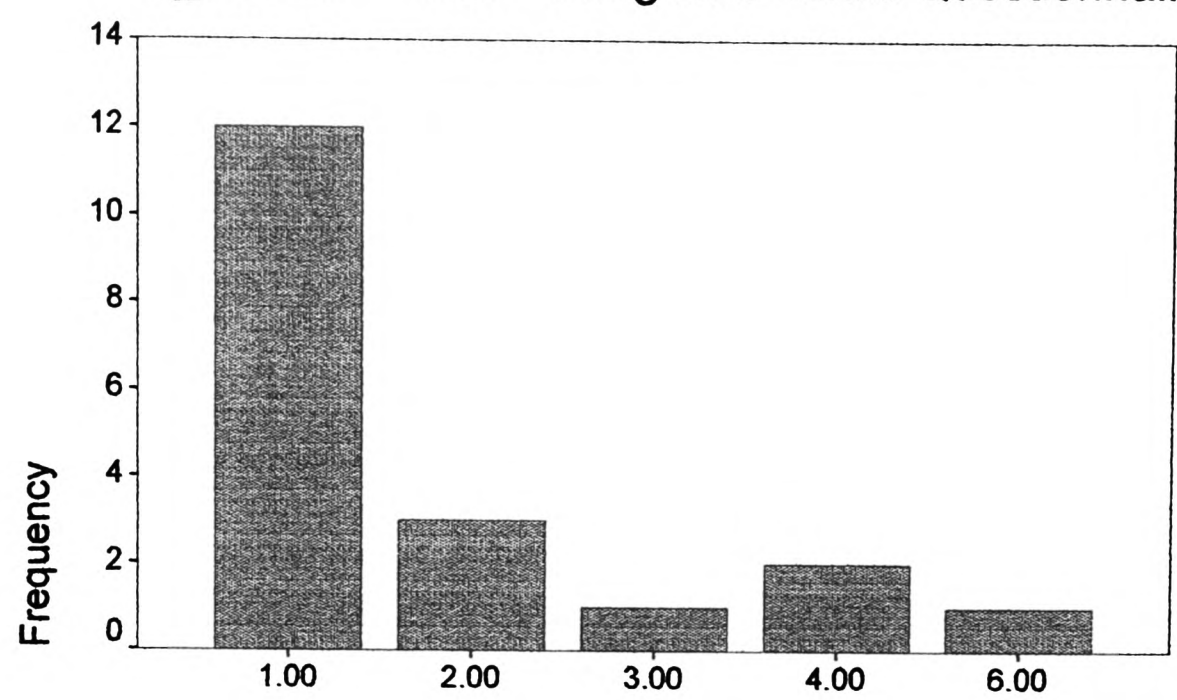
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q26

q27

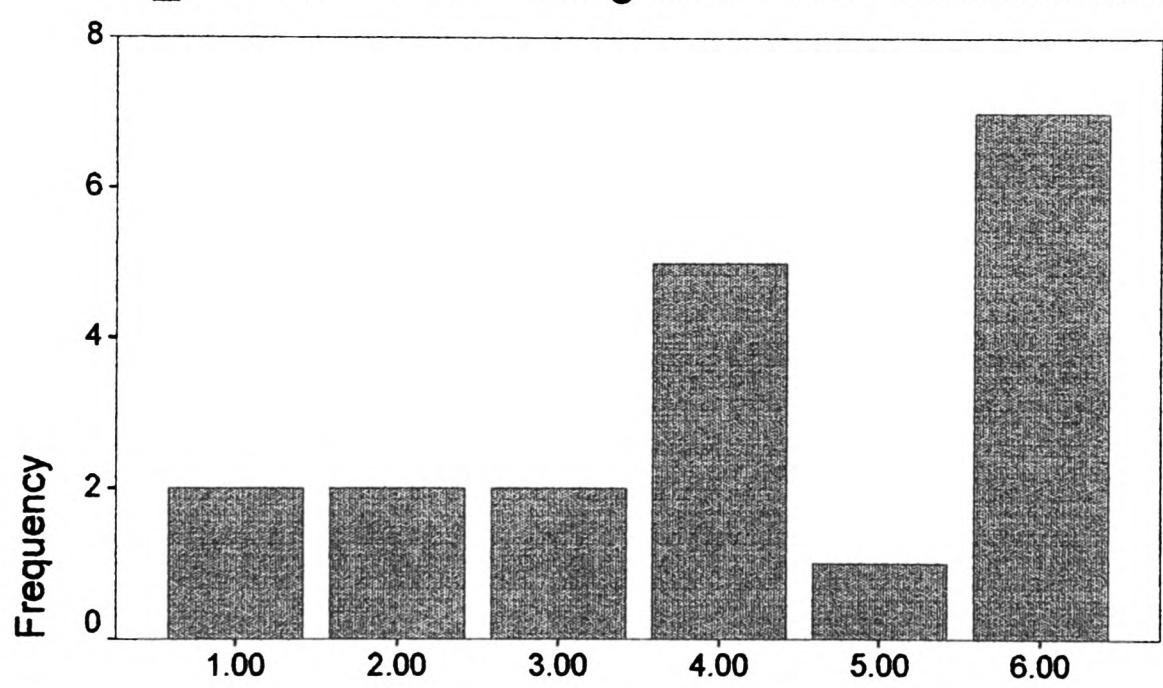
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q27

q28

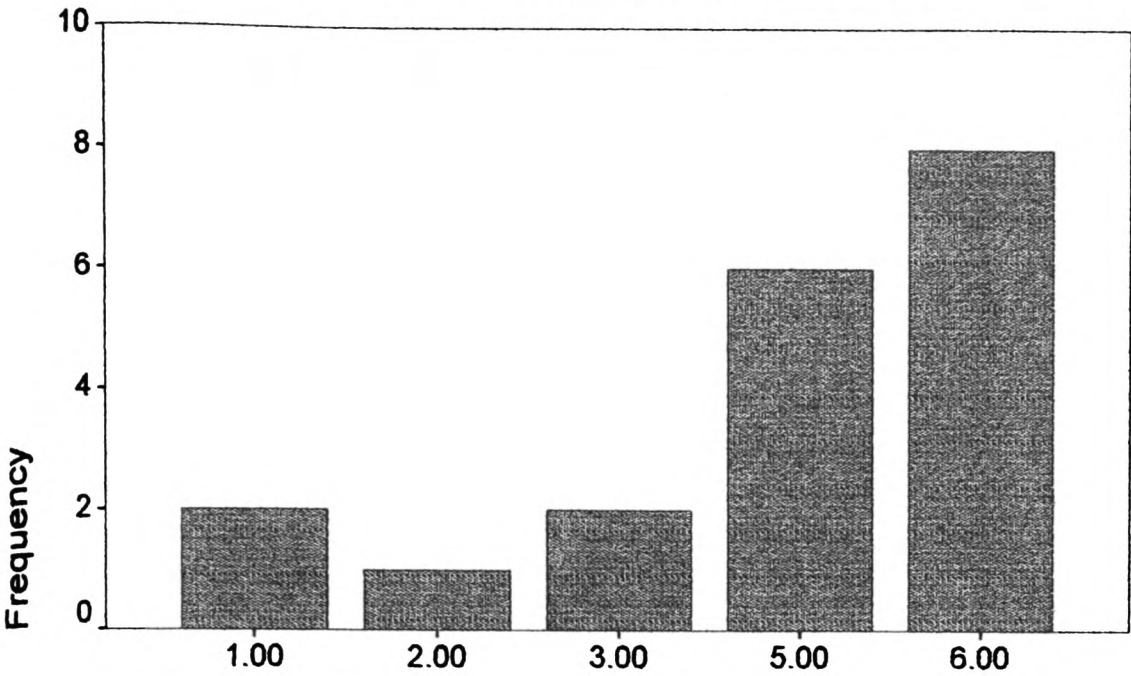
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q28

q29

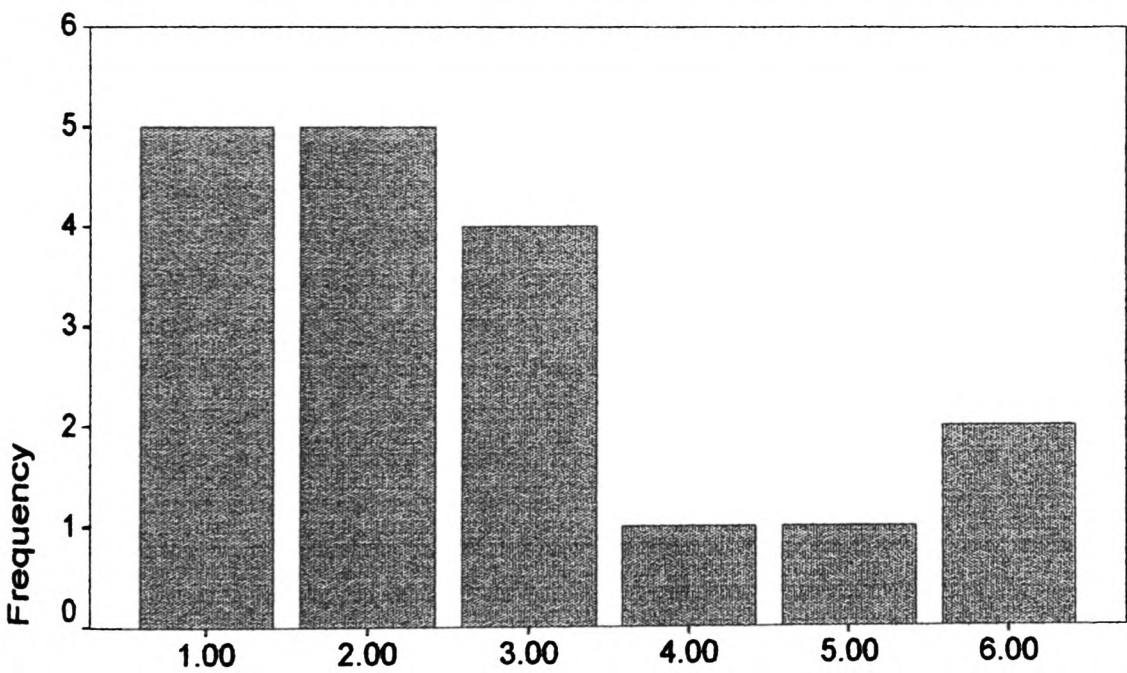
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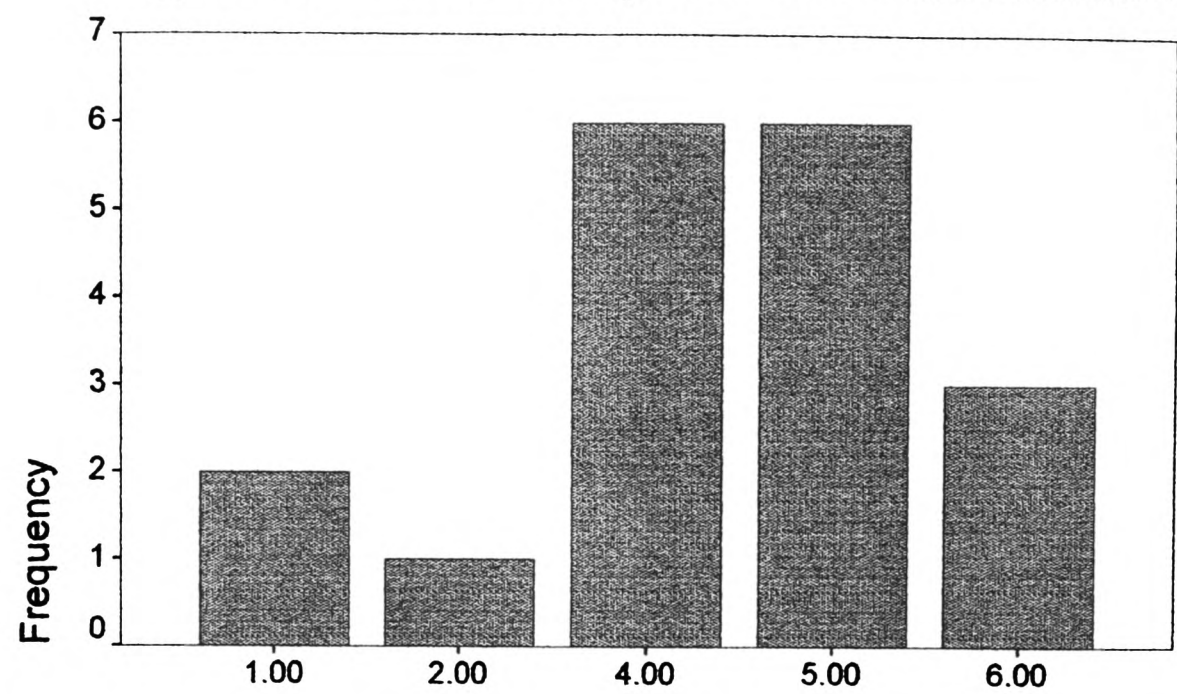
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q30

q31

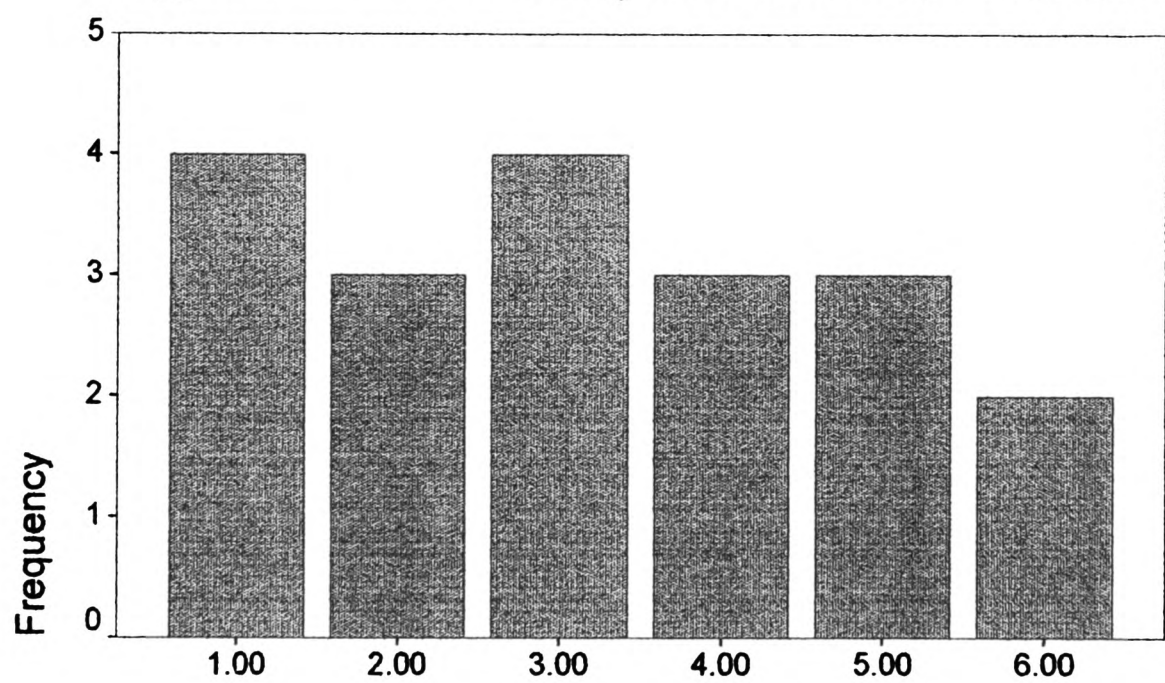
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q31

q32

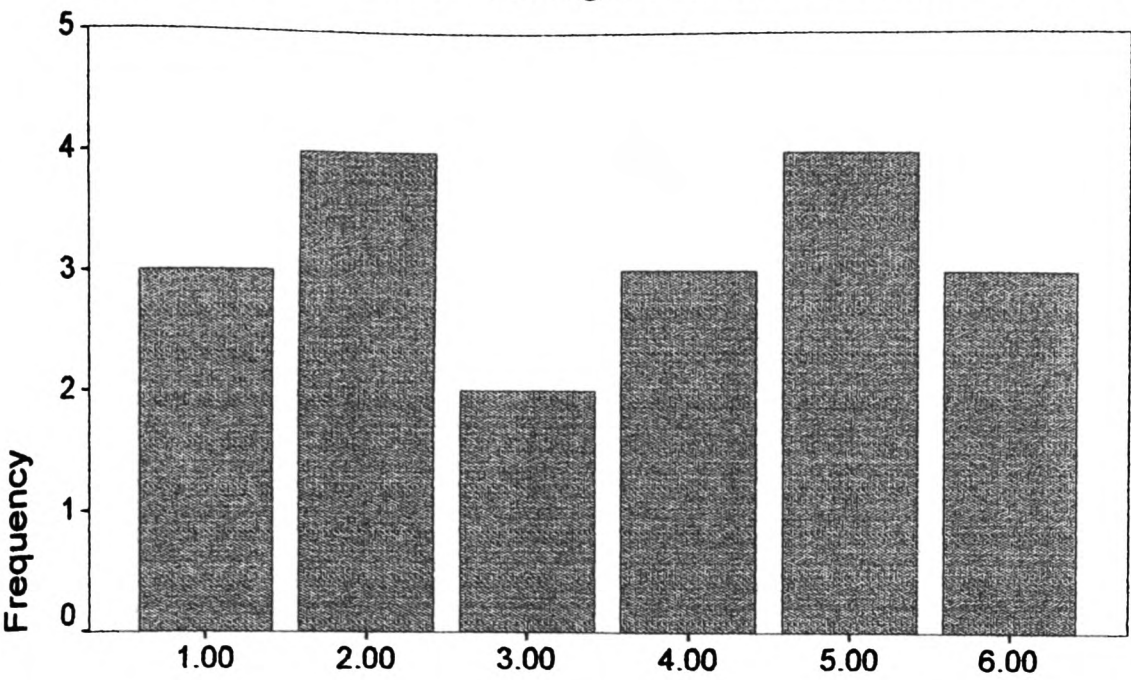
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q32

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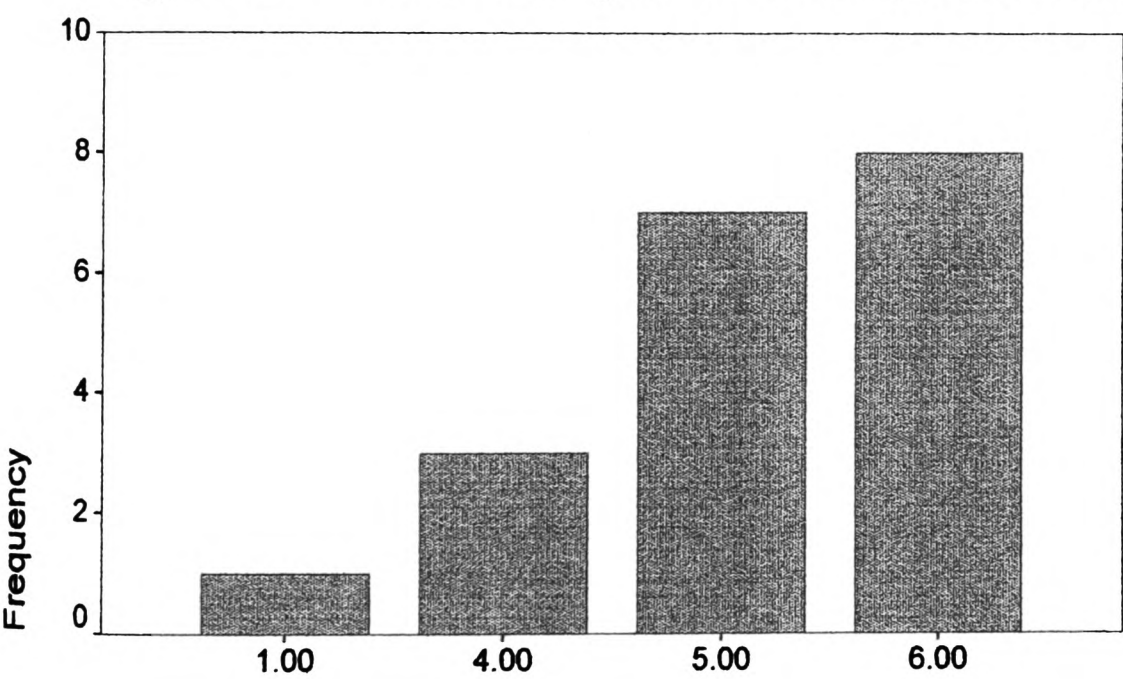
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q33

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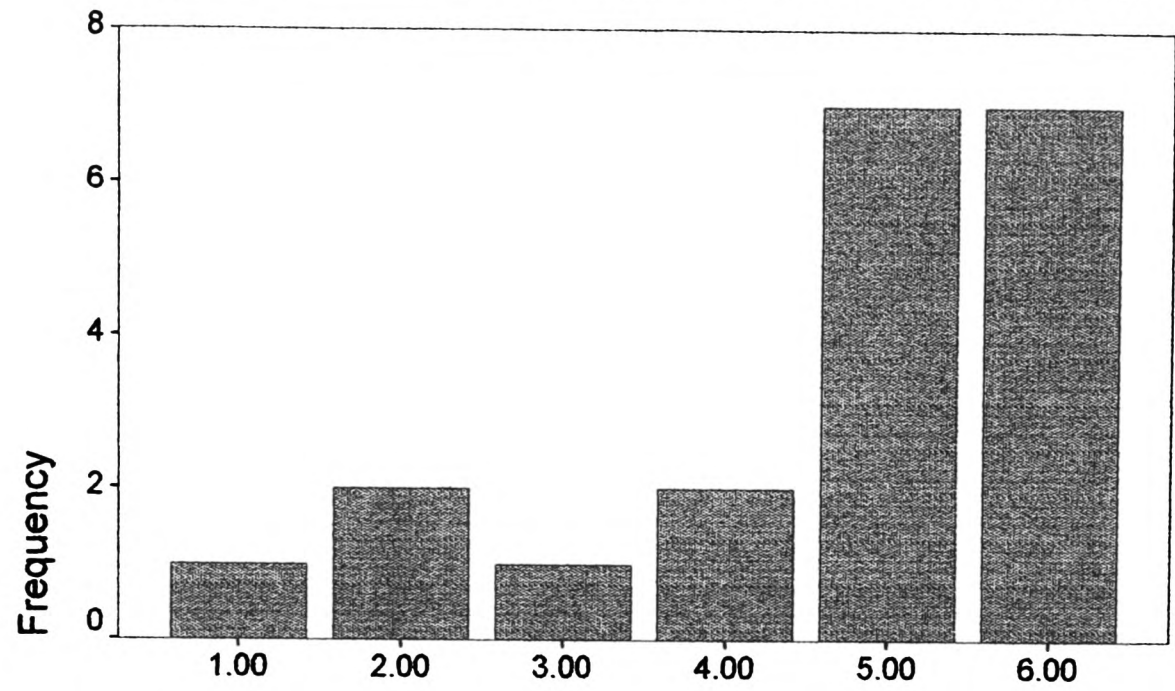
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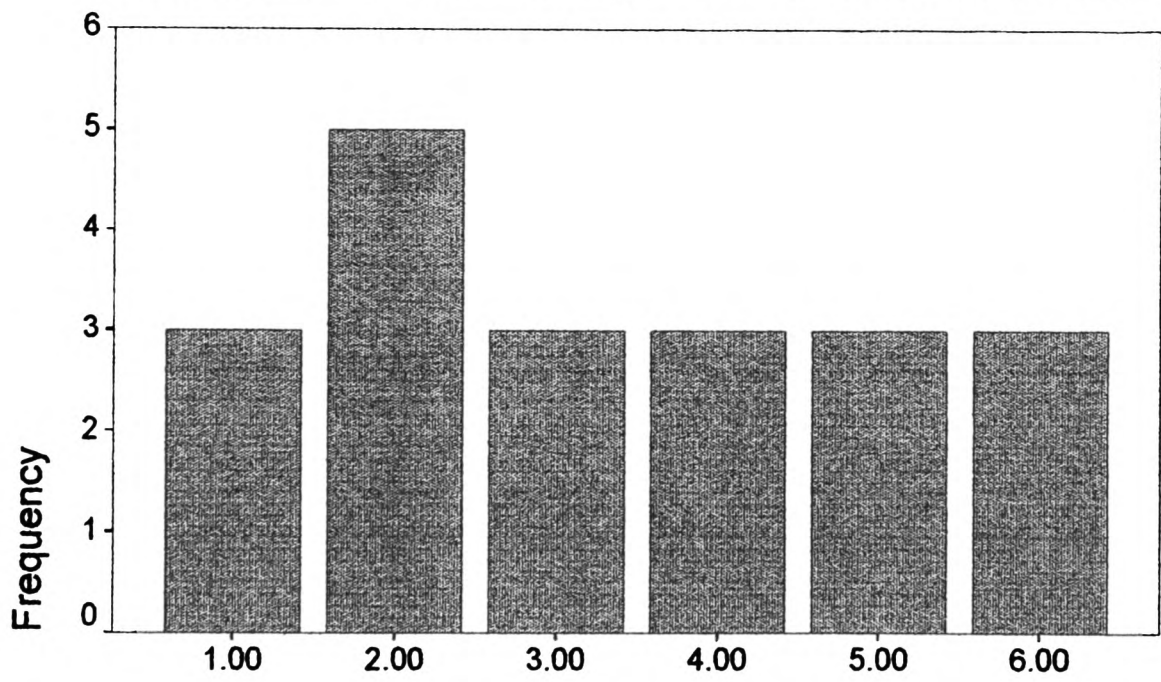
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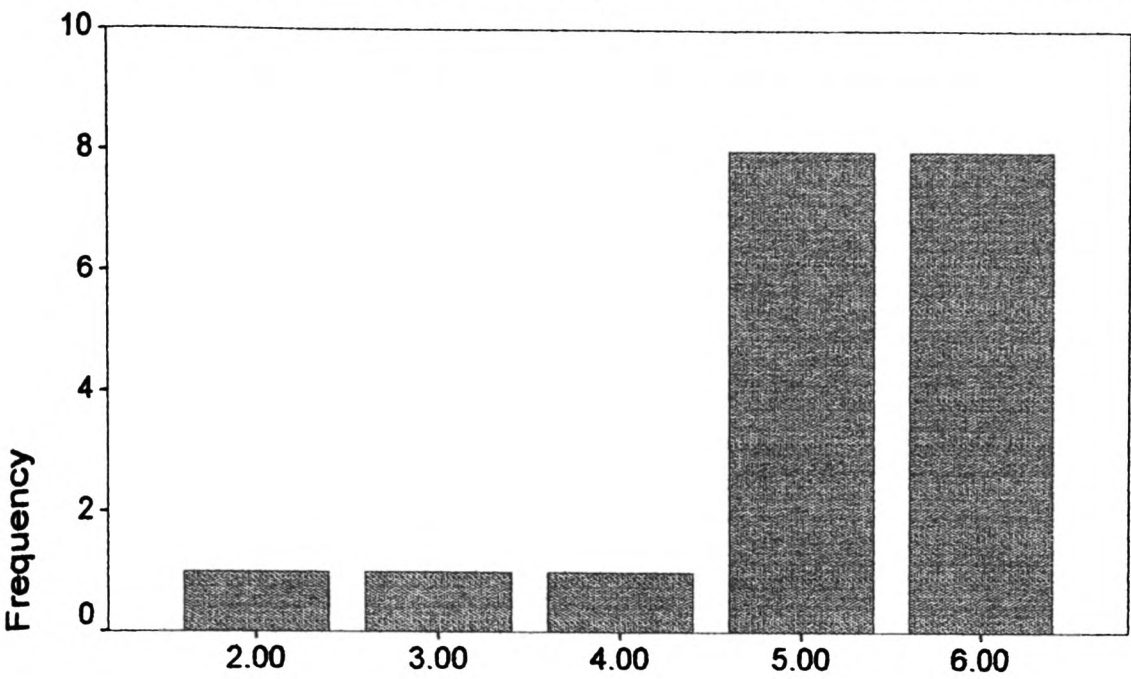
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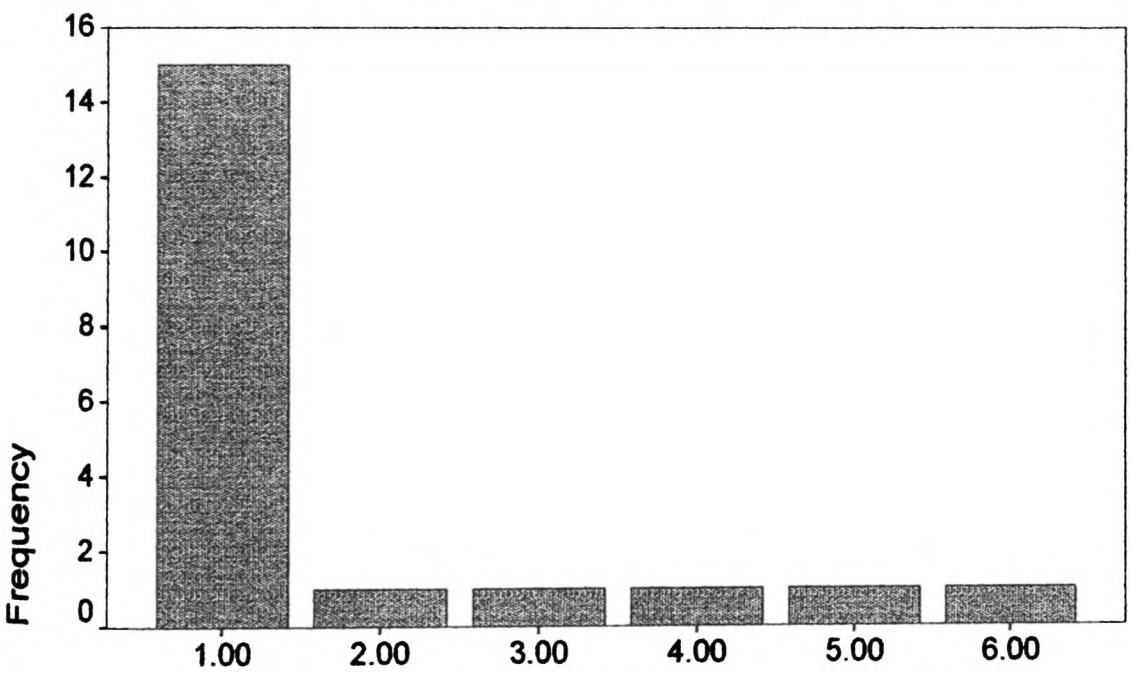
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q37

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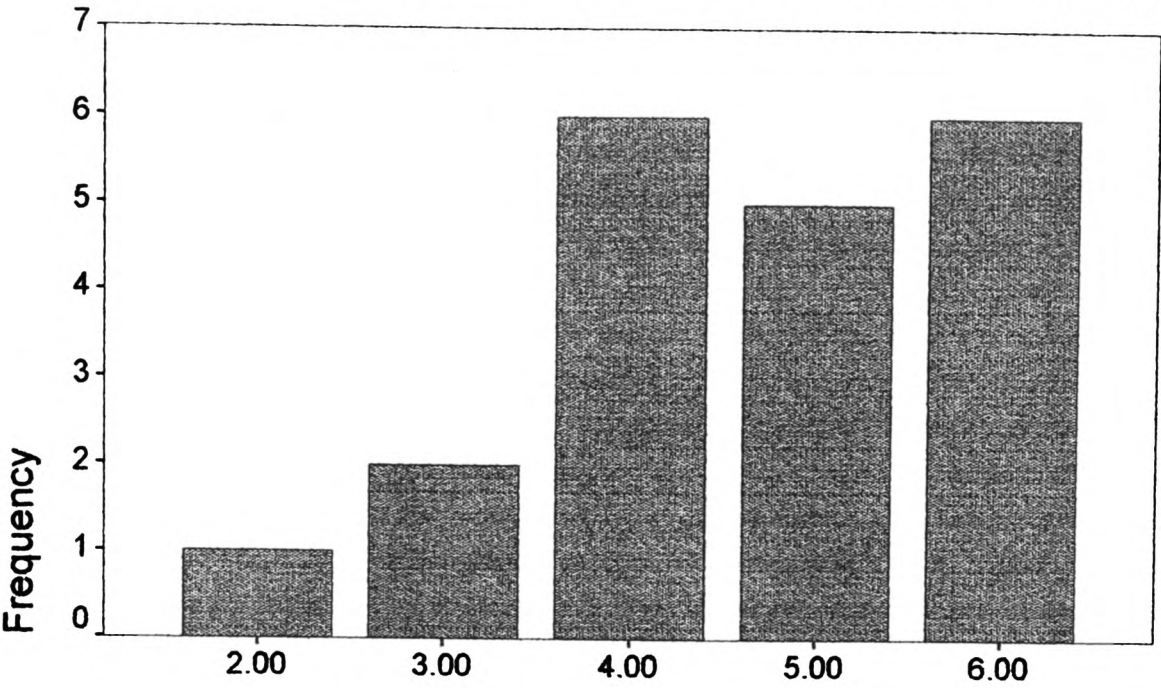
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q38

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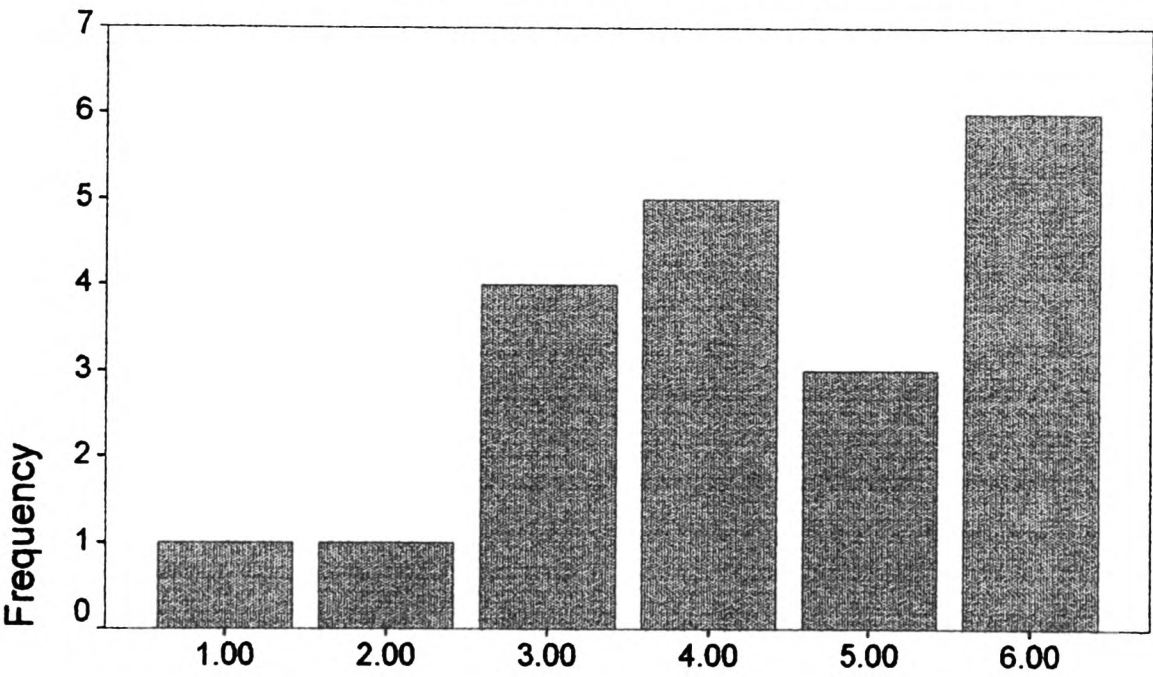
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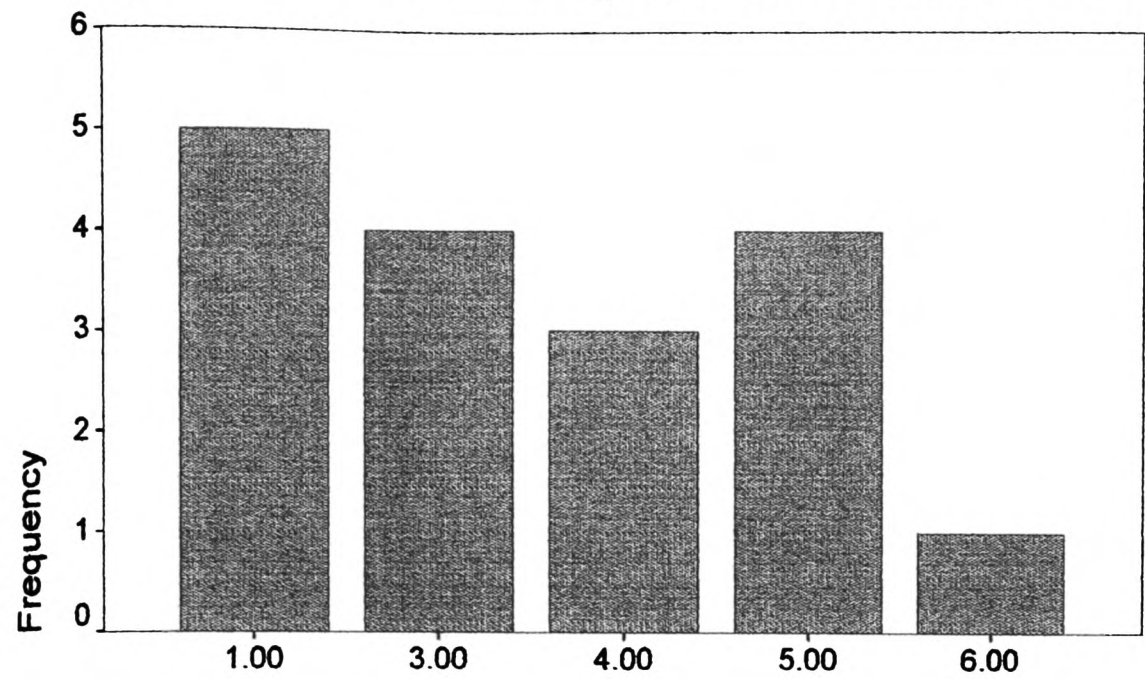
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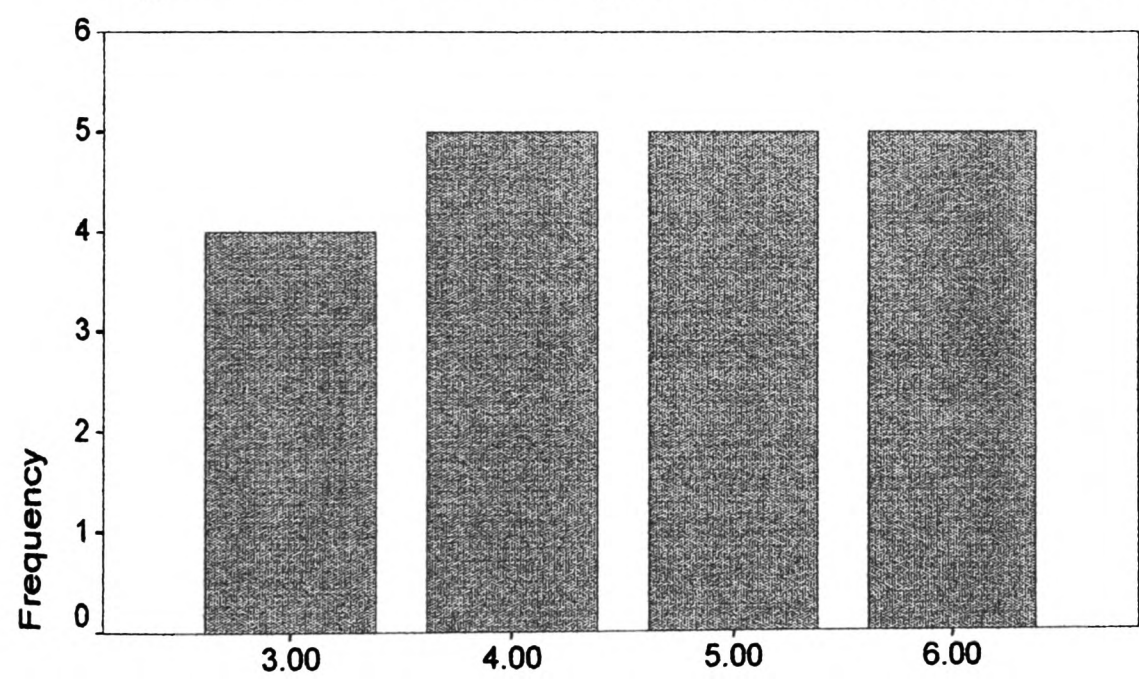
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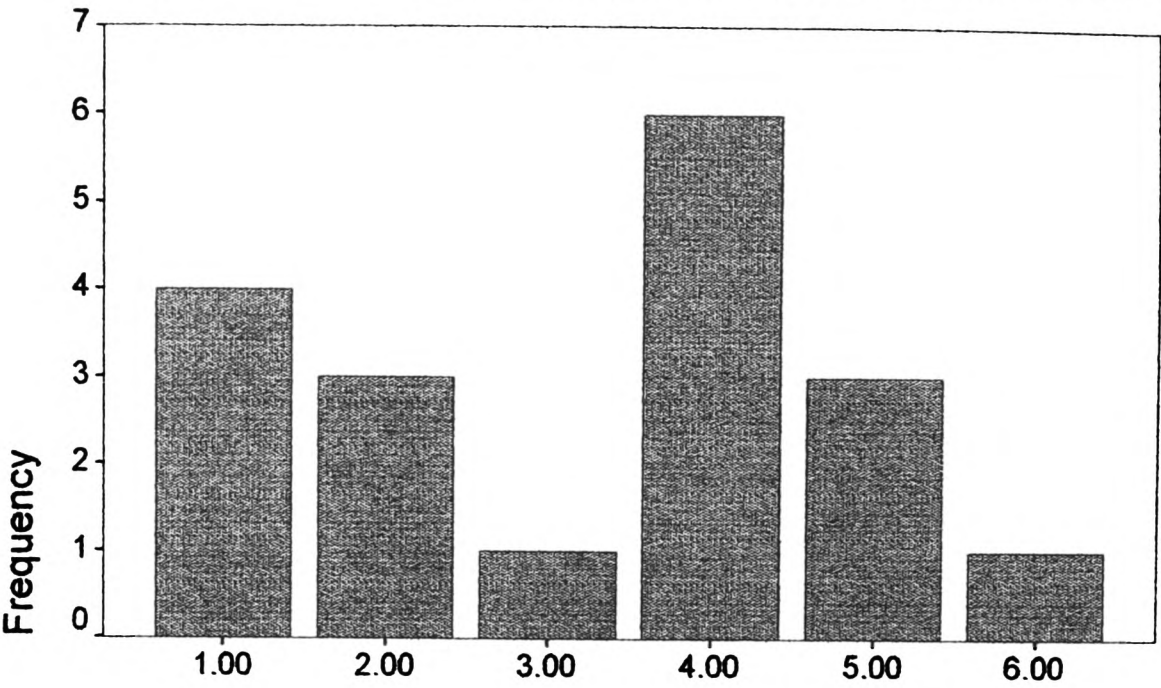
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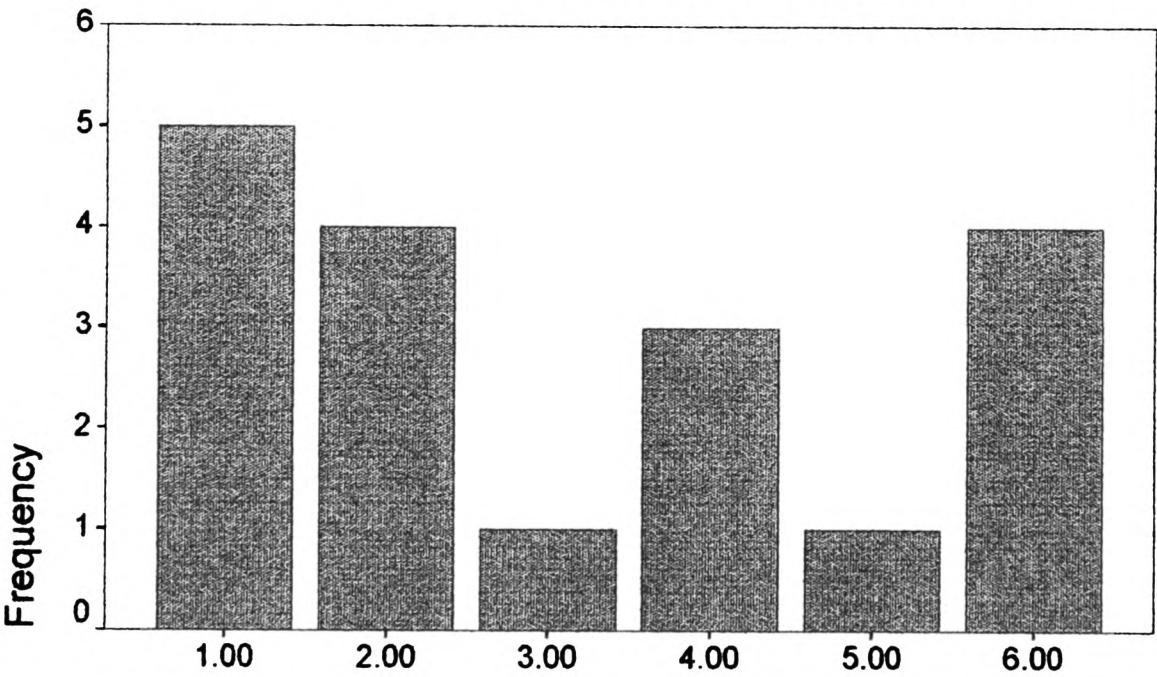
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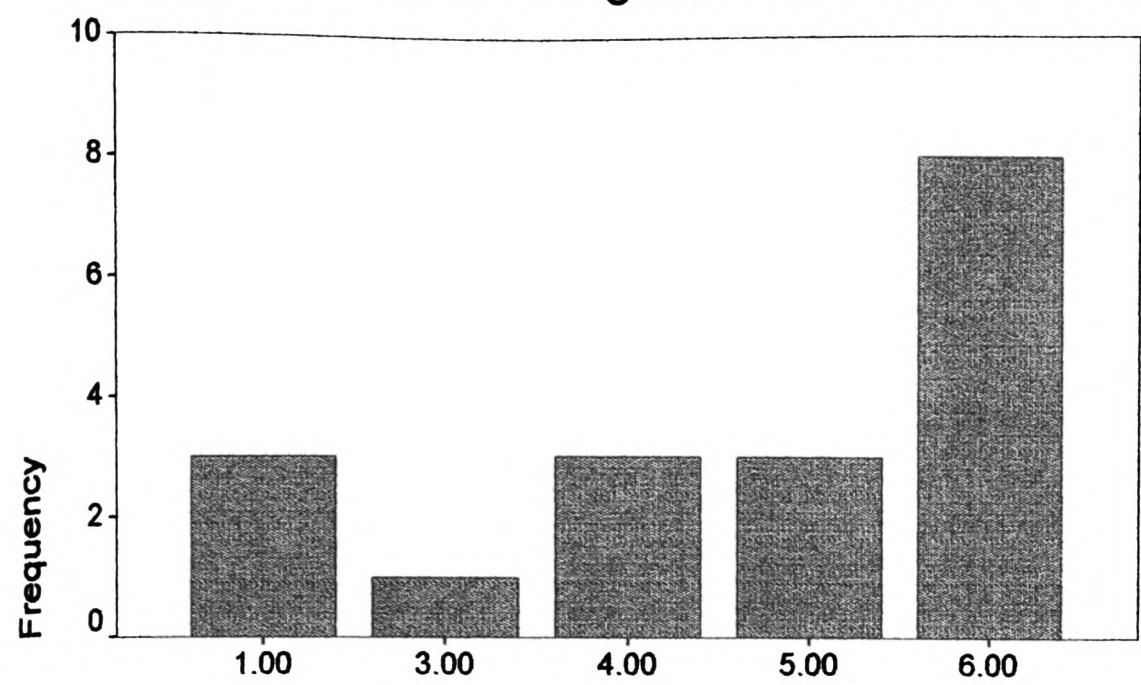
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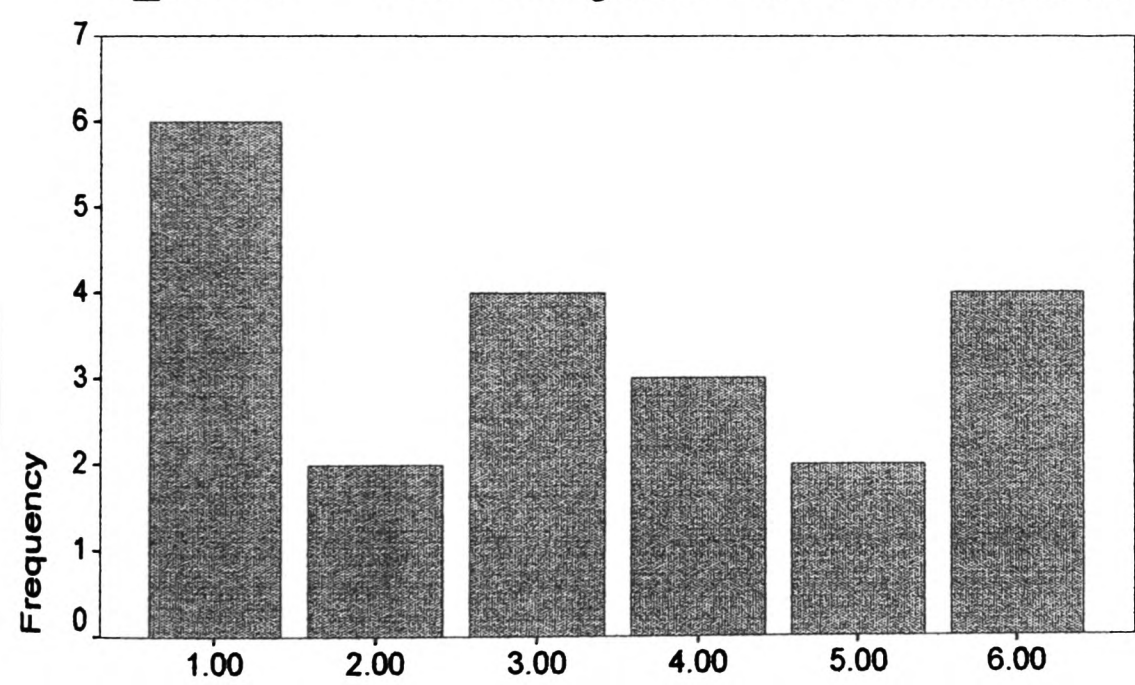
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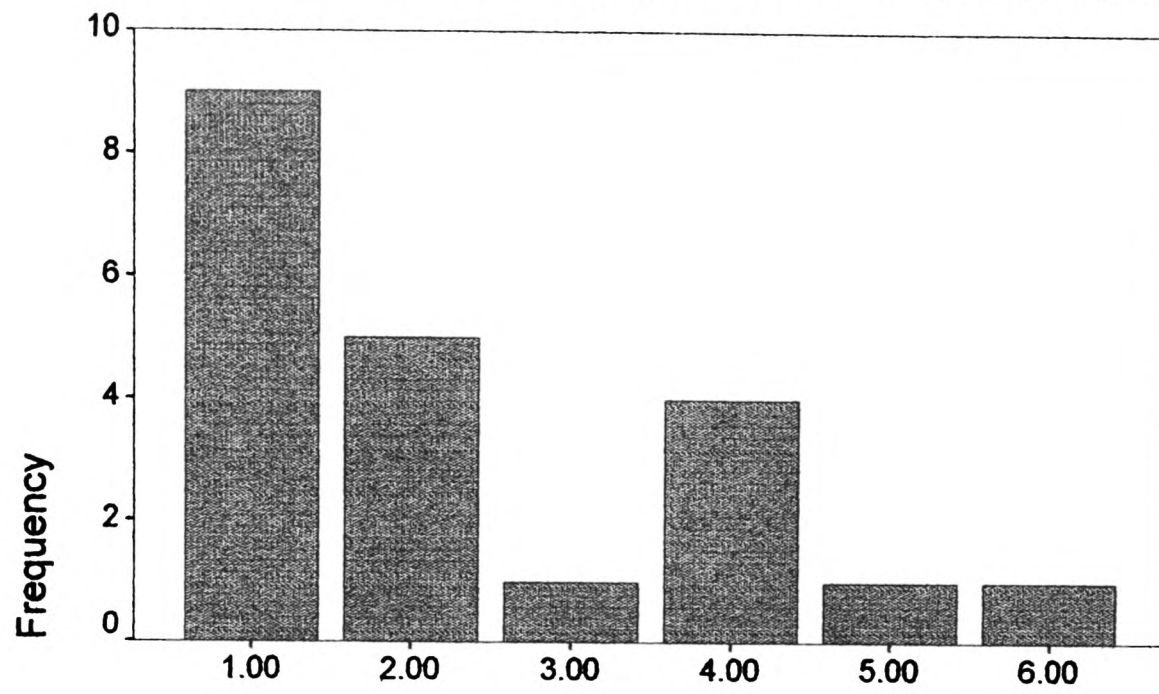
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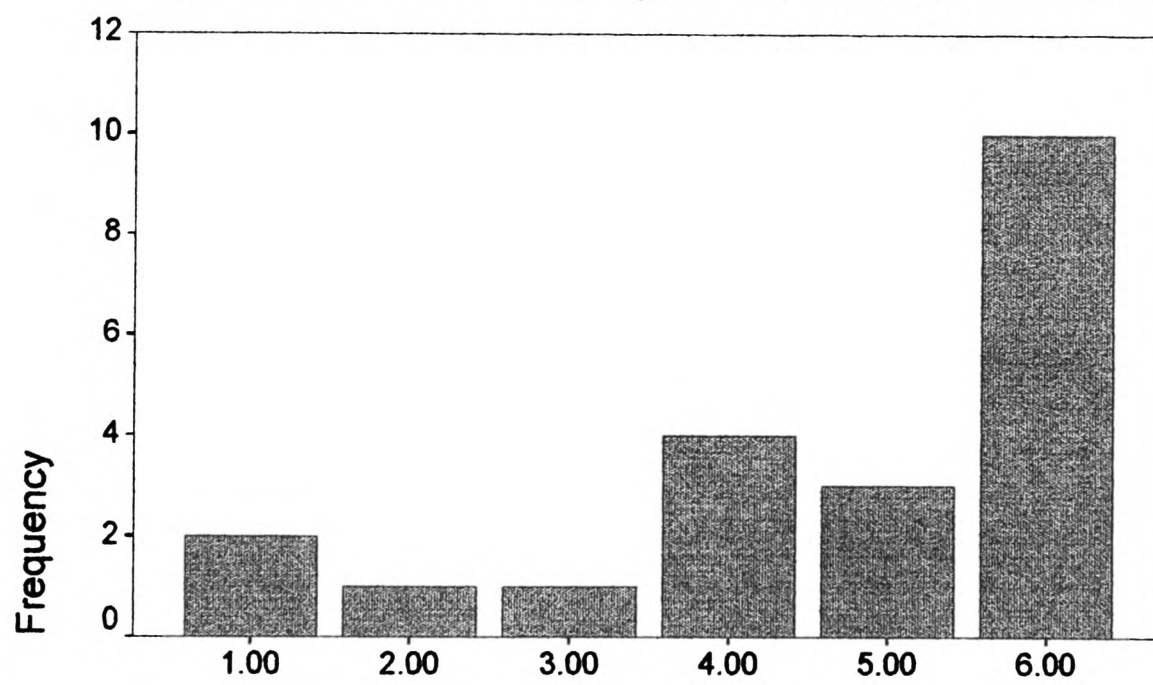
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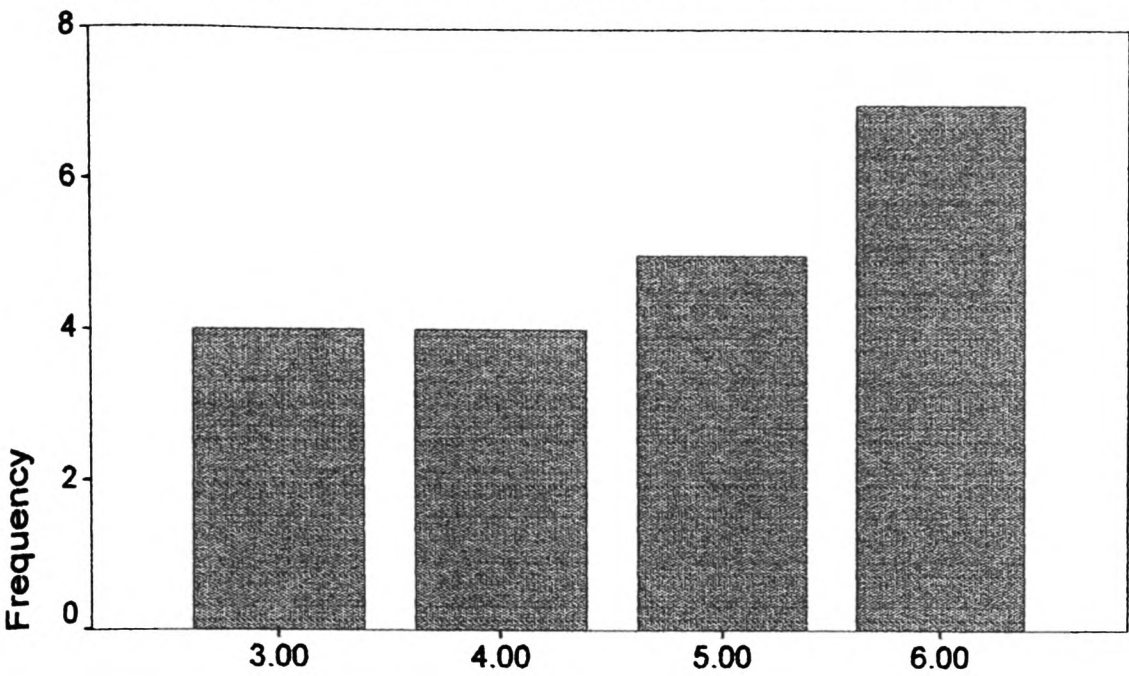
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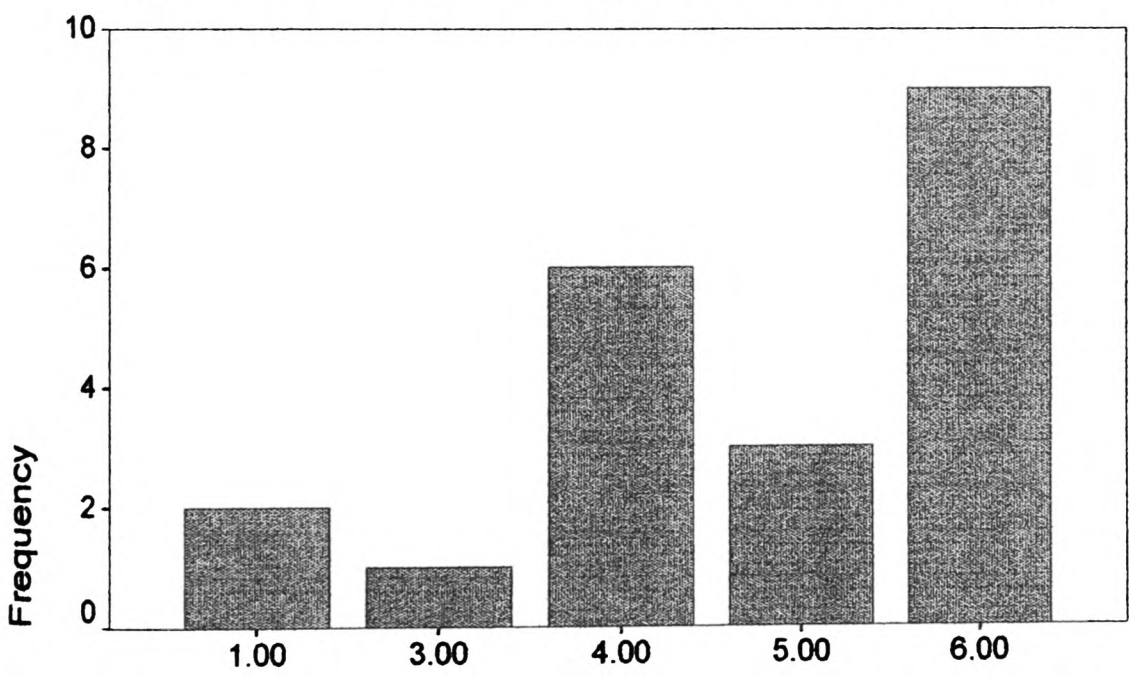
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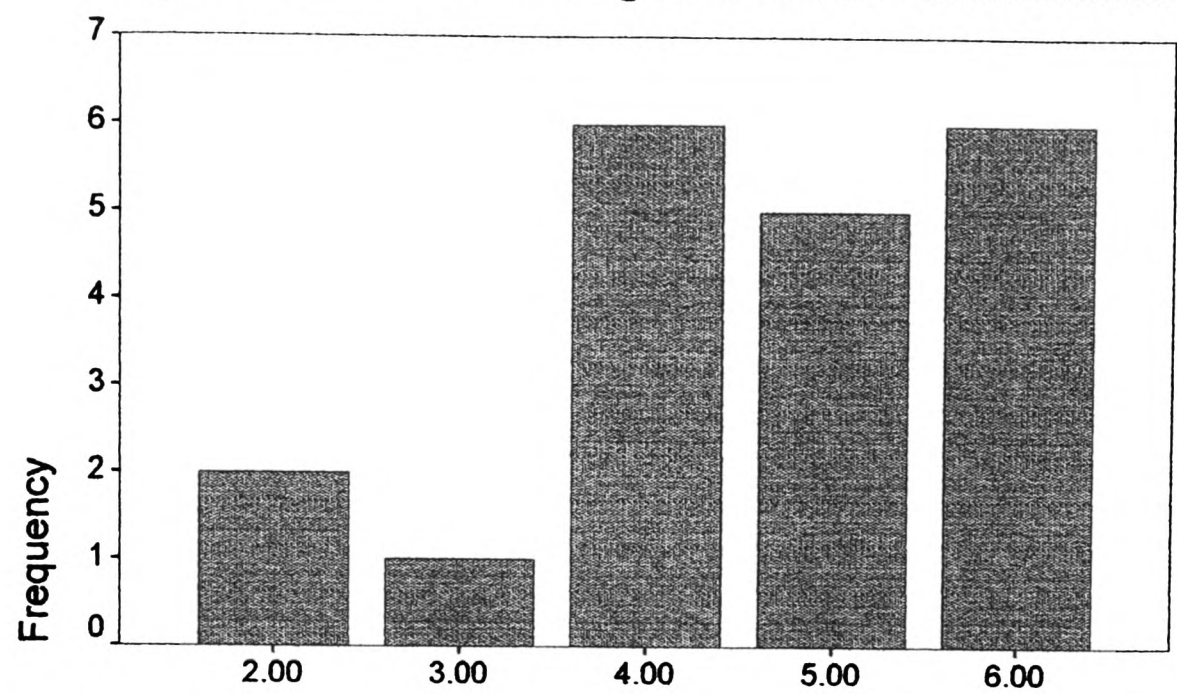
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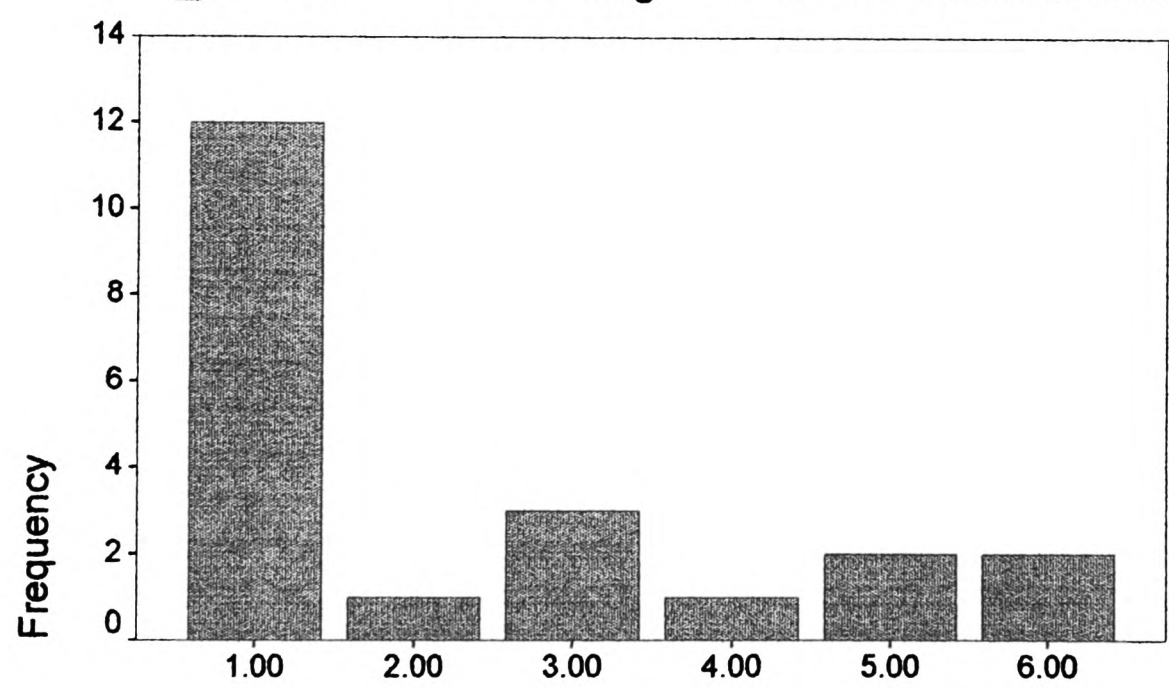
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q51

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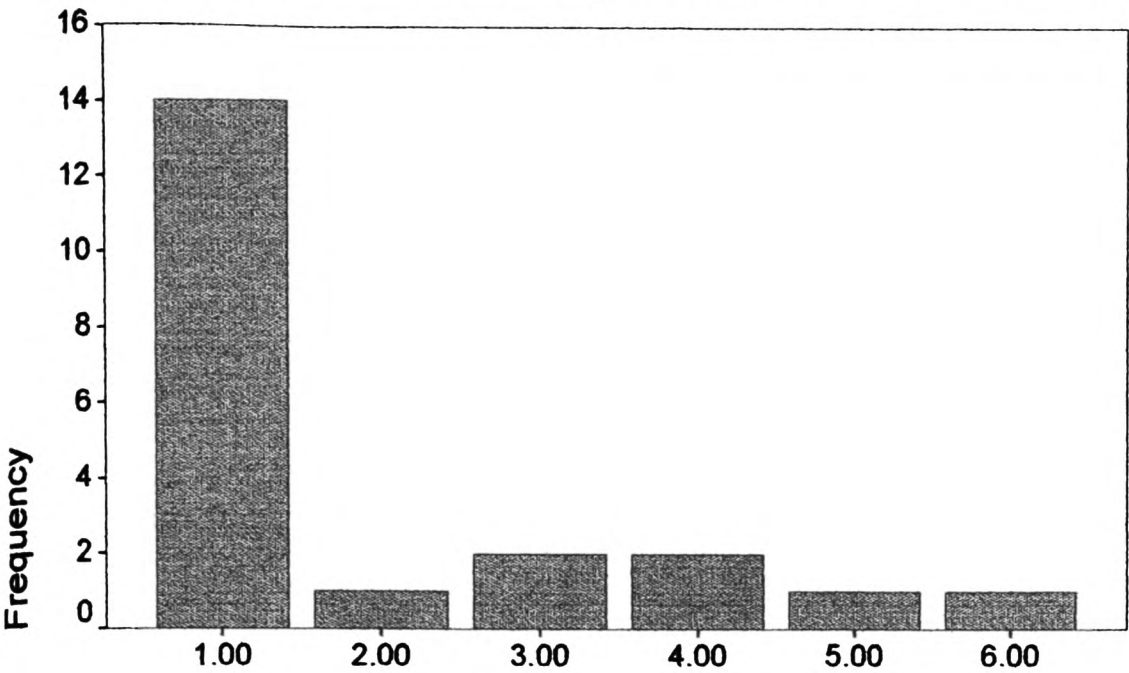
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q52

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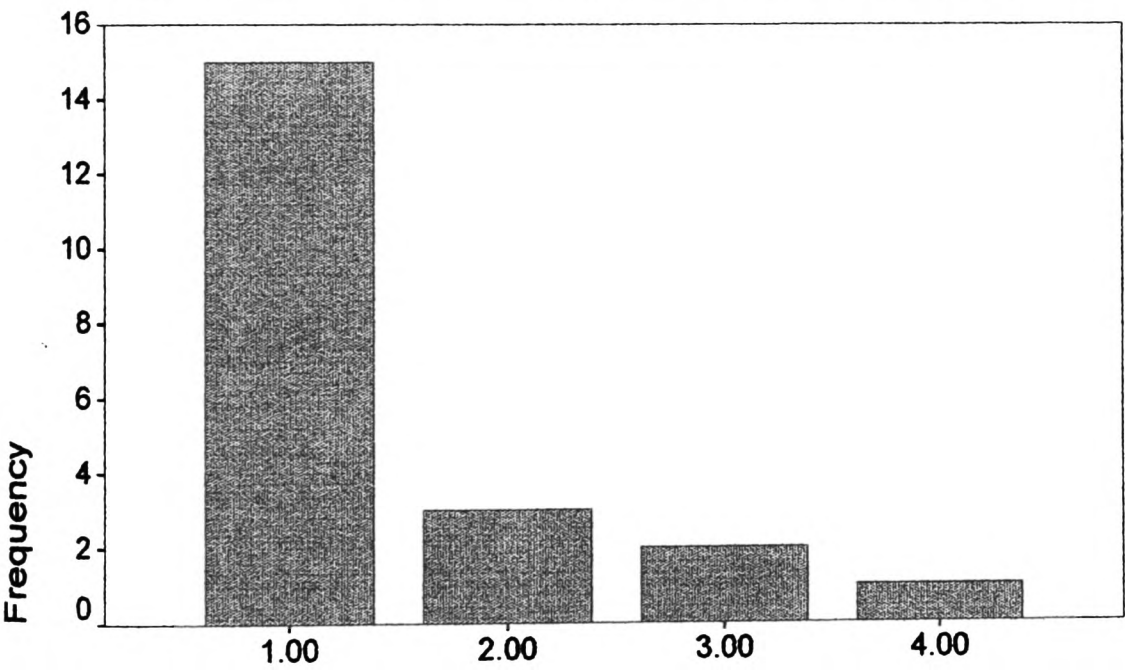
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q53

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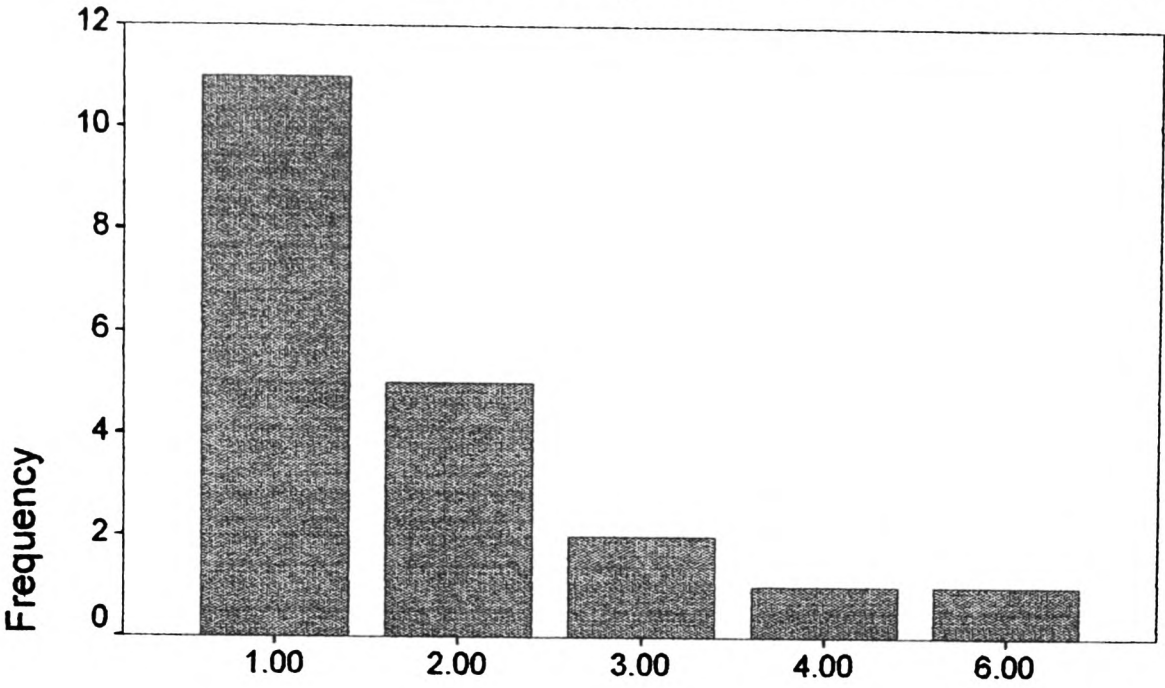
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q54

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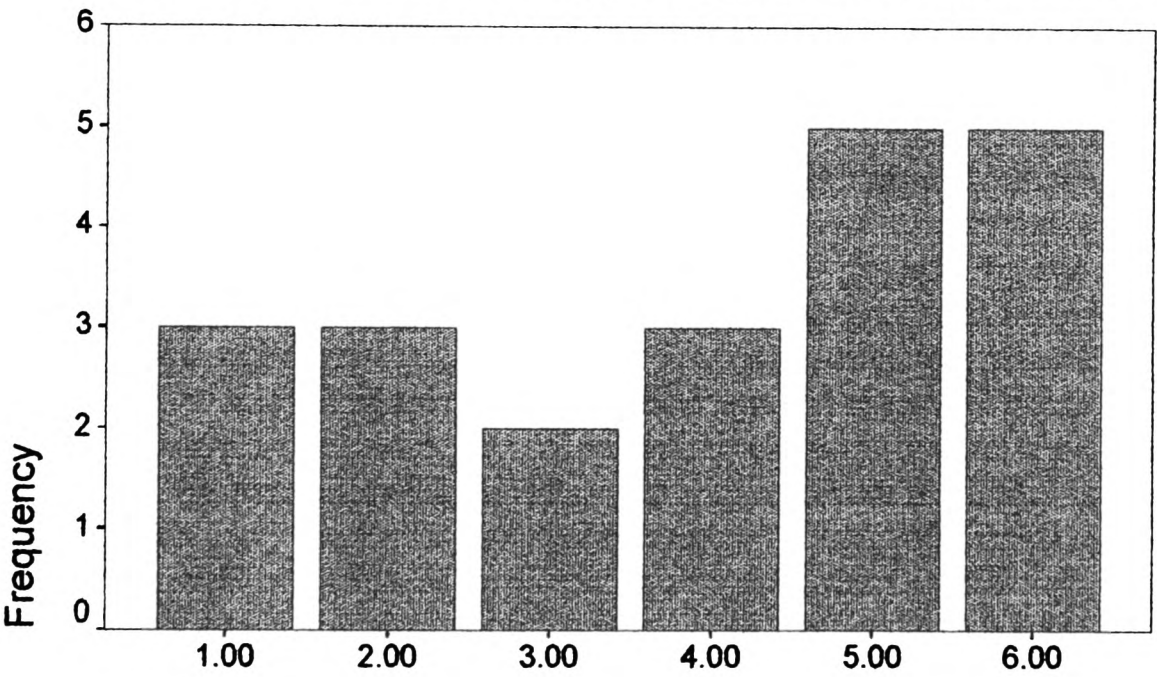
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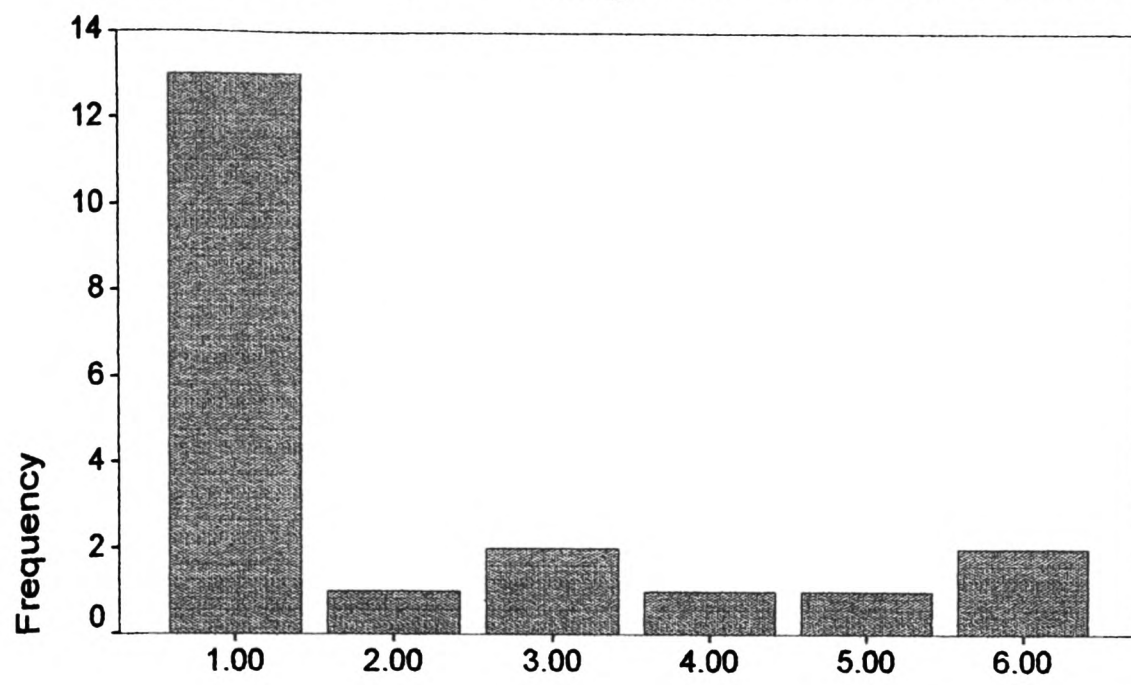
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q56

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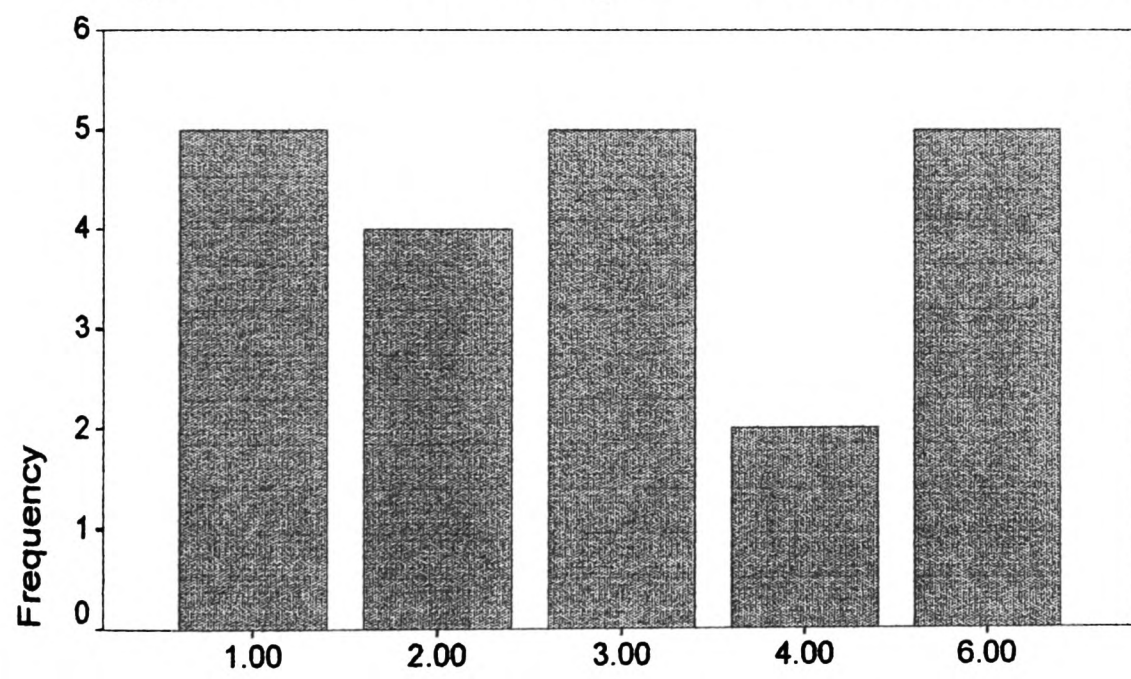
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q57

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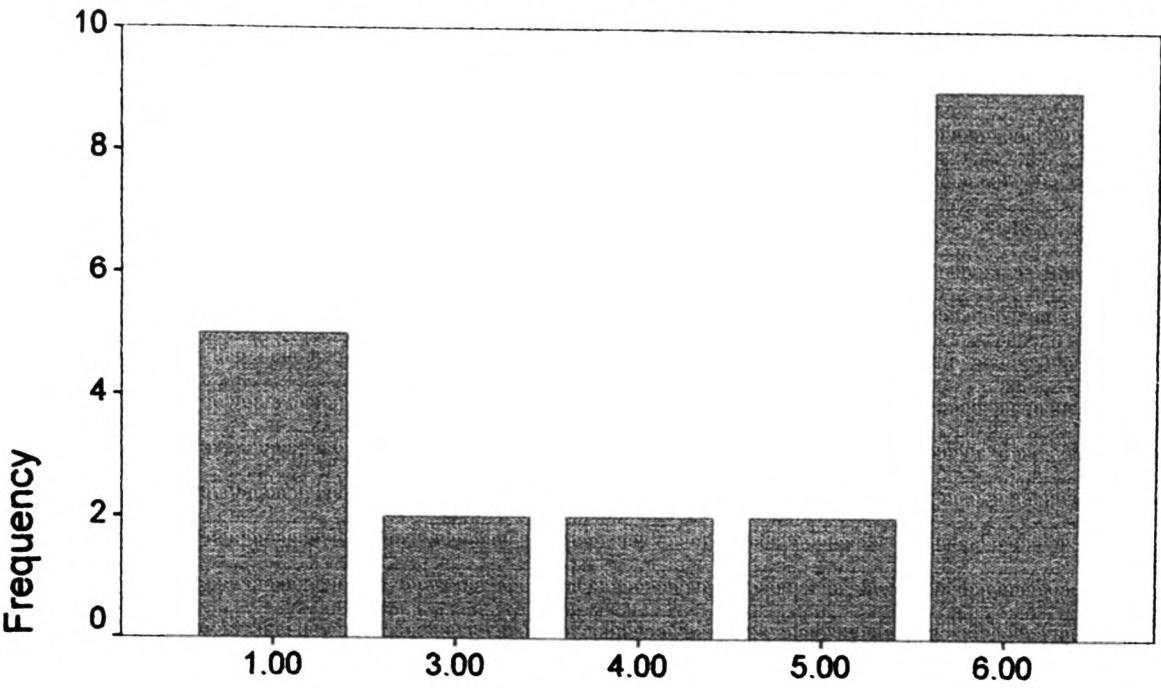
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q58

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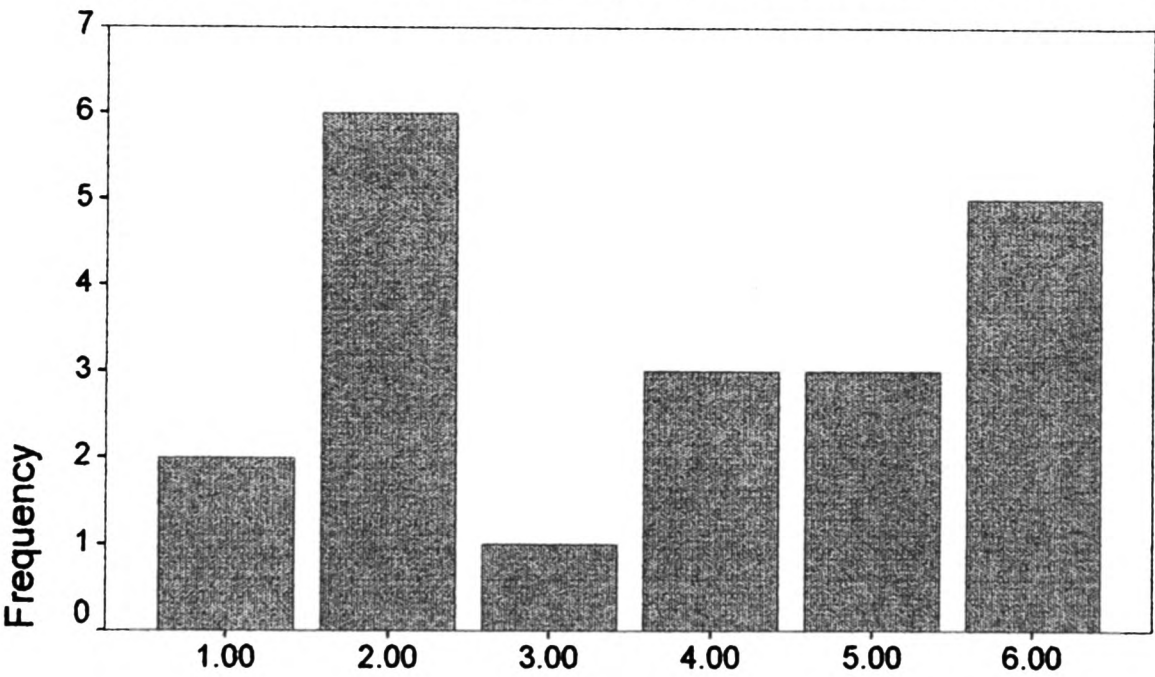
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q59

q60

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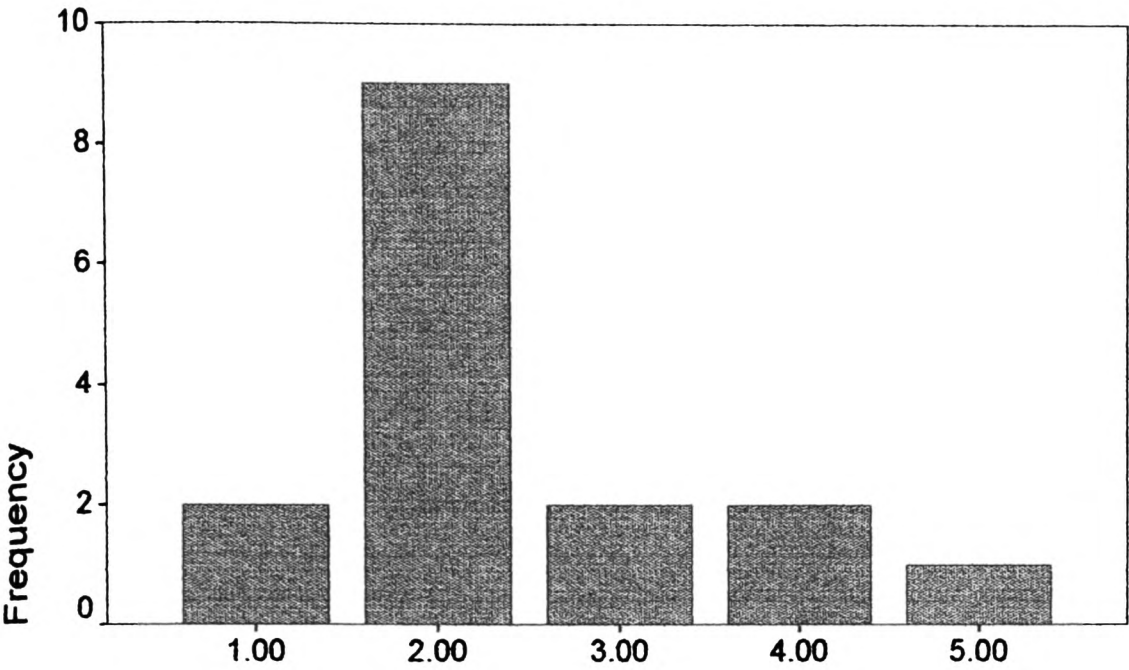


q60

Bar Chart

q1

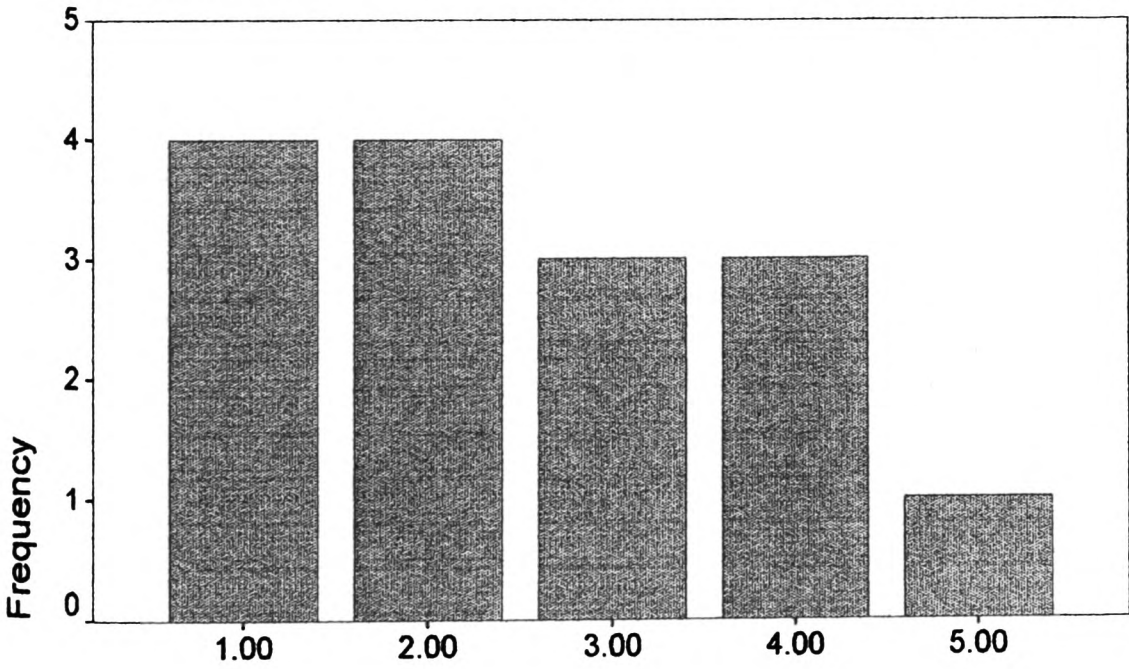
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q1

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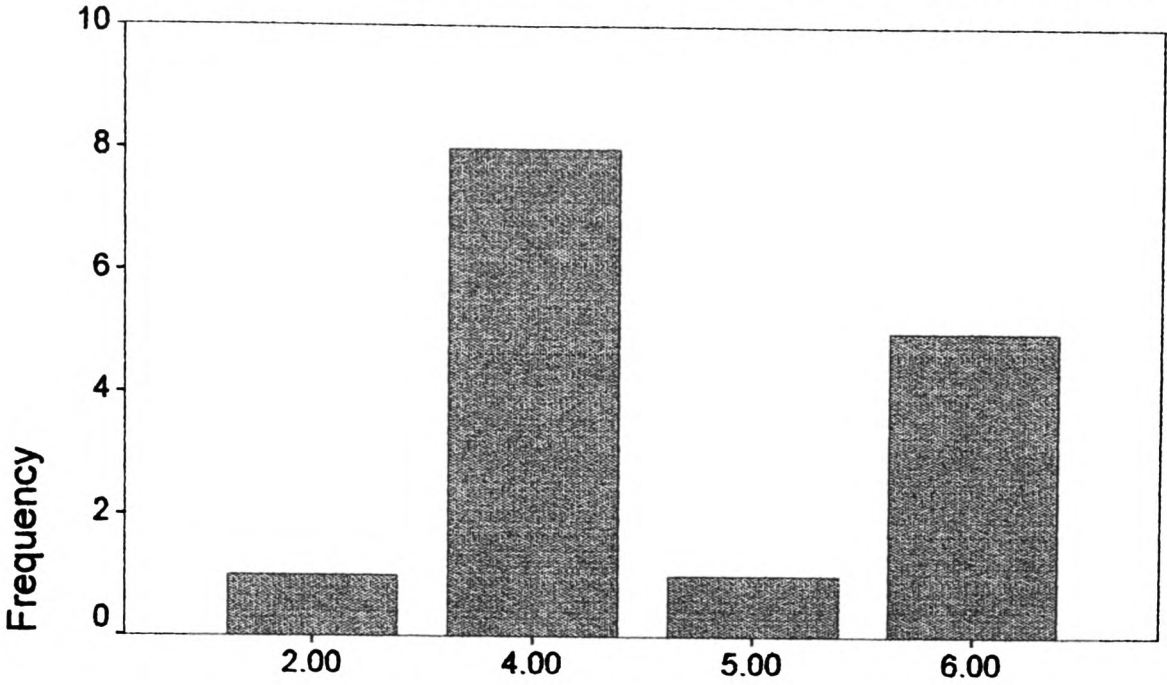
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q2

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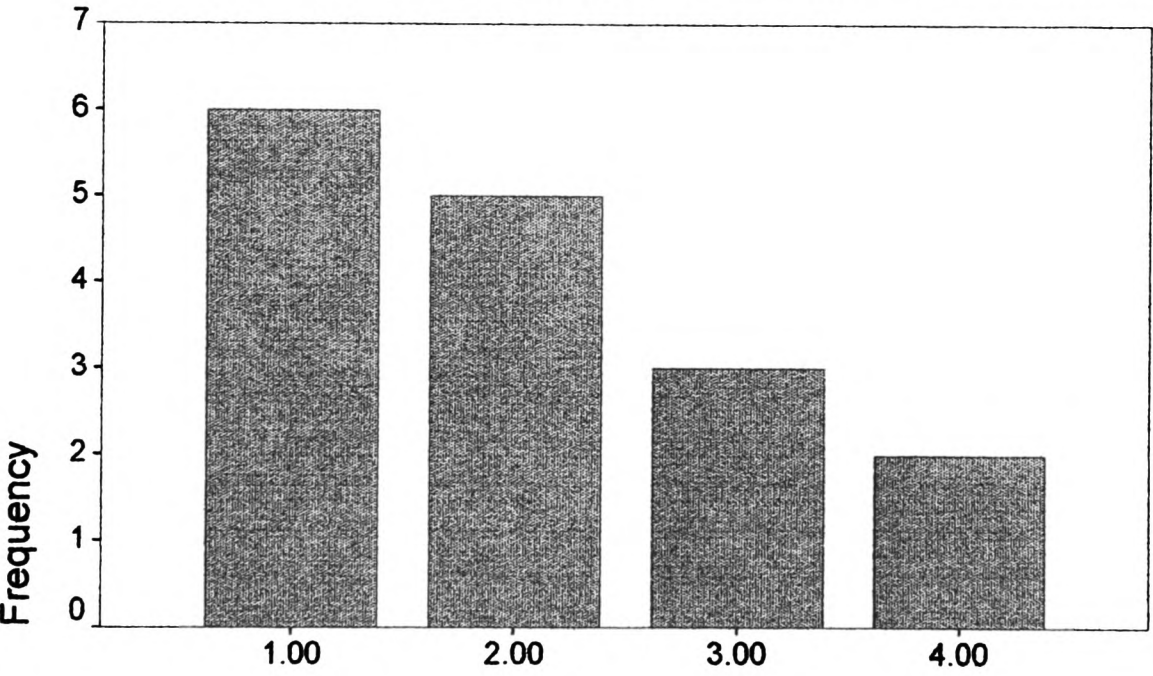
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q3

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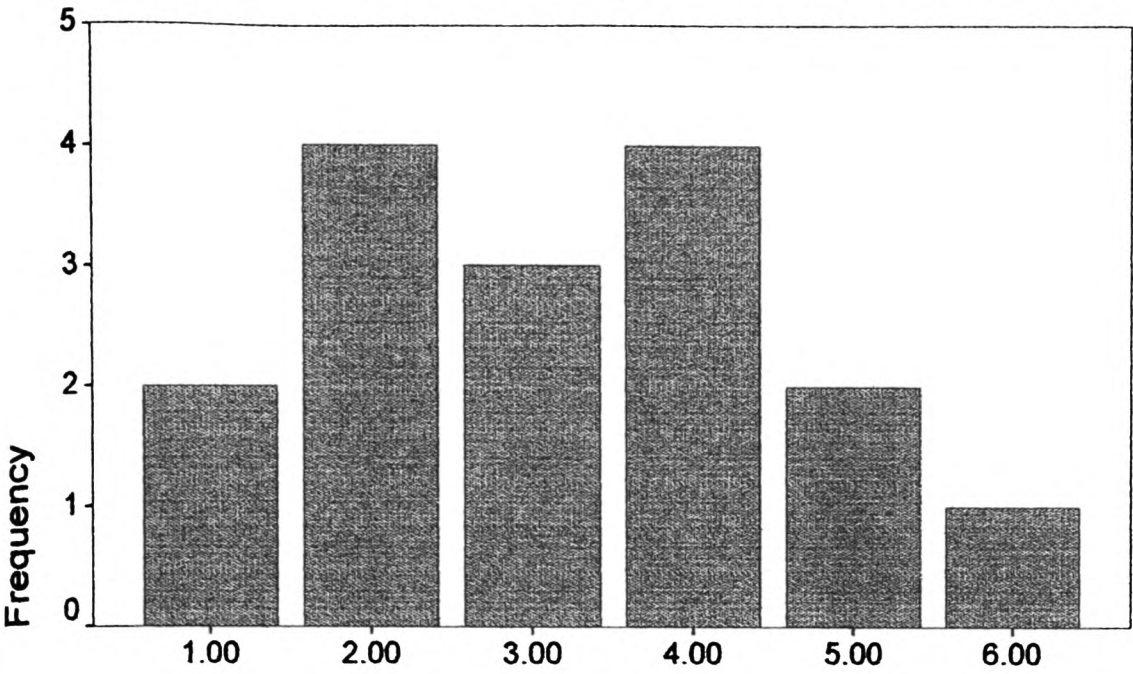
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q4

q5

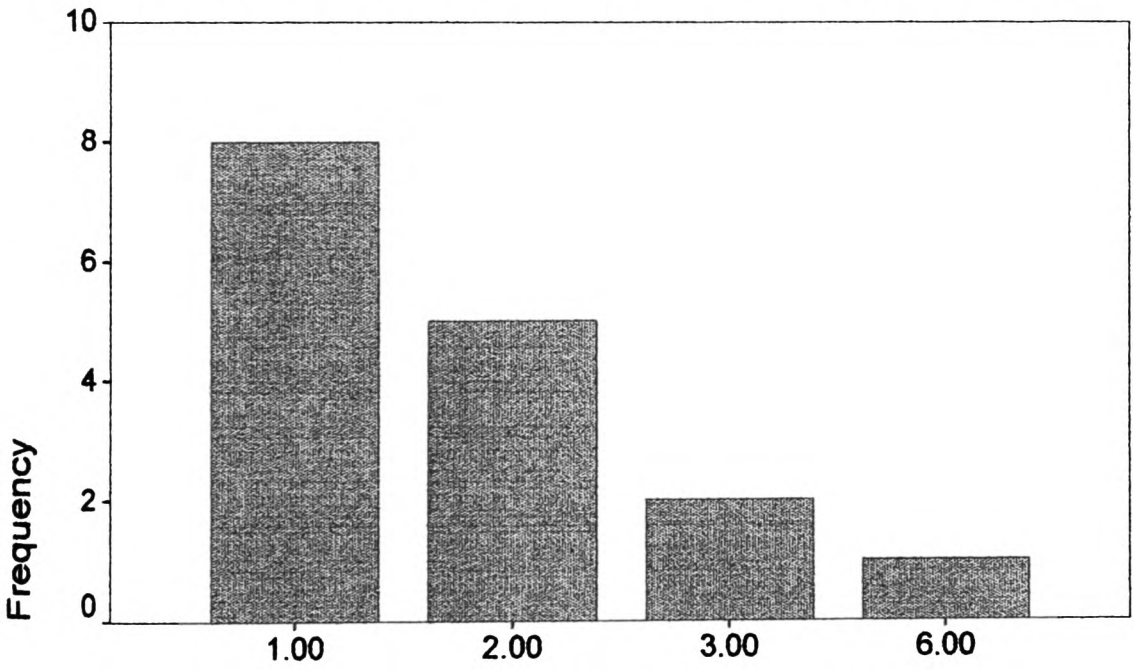
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q5

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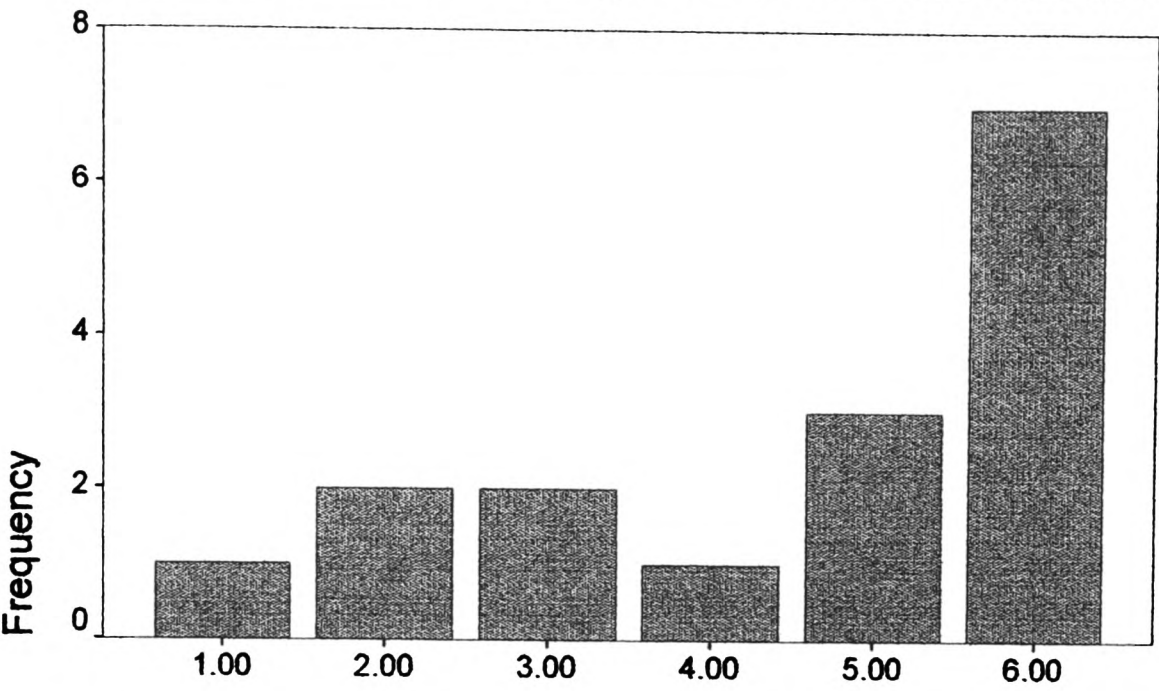
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q6

q7

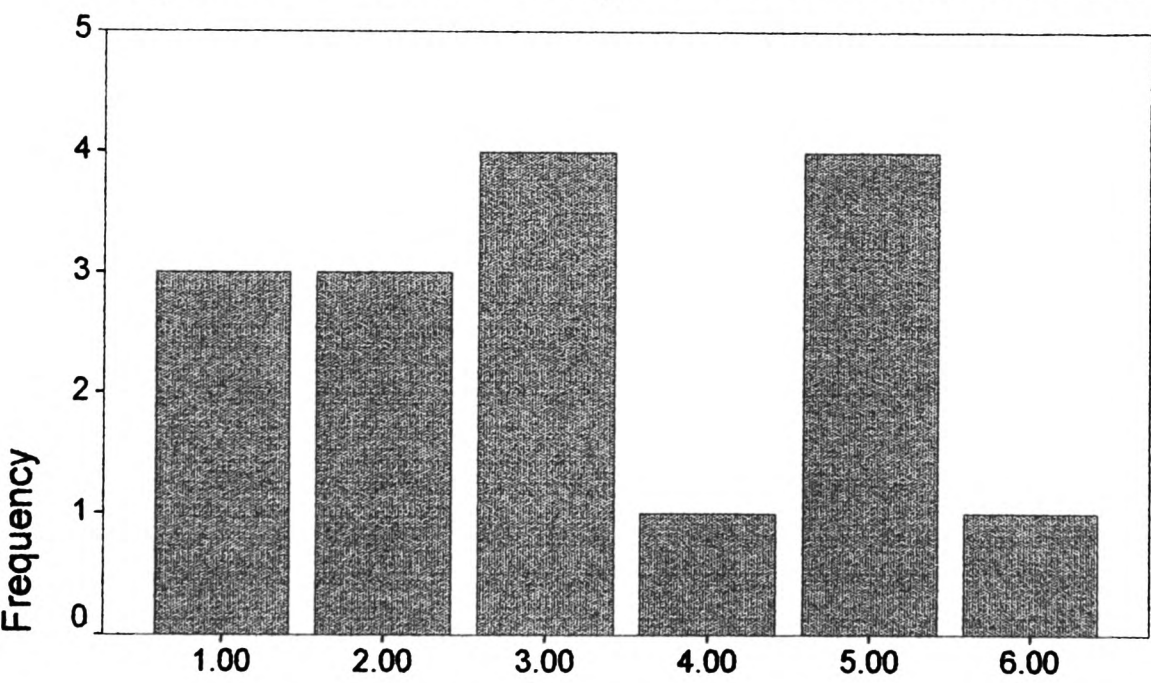
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q7

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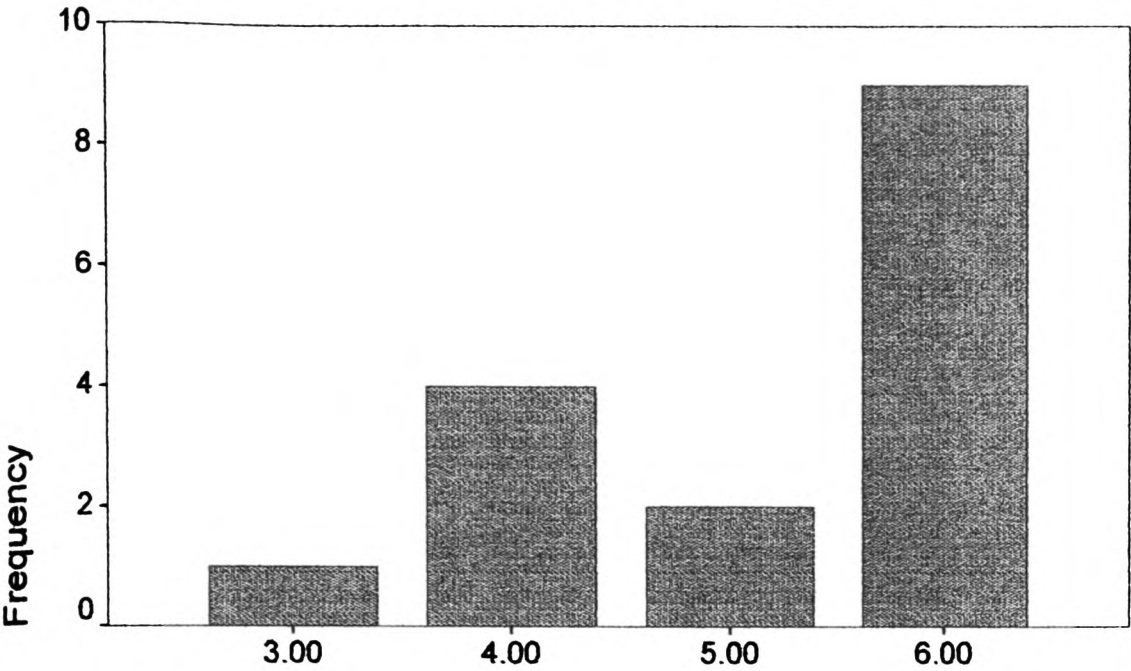
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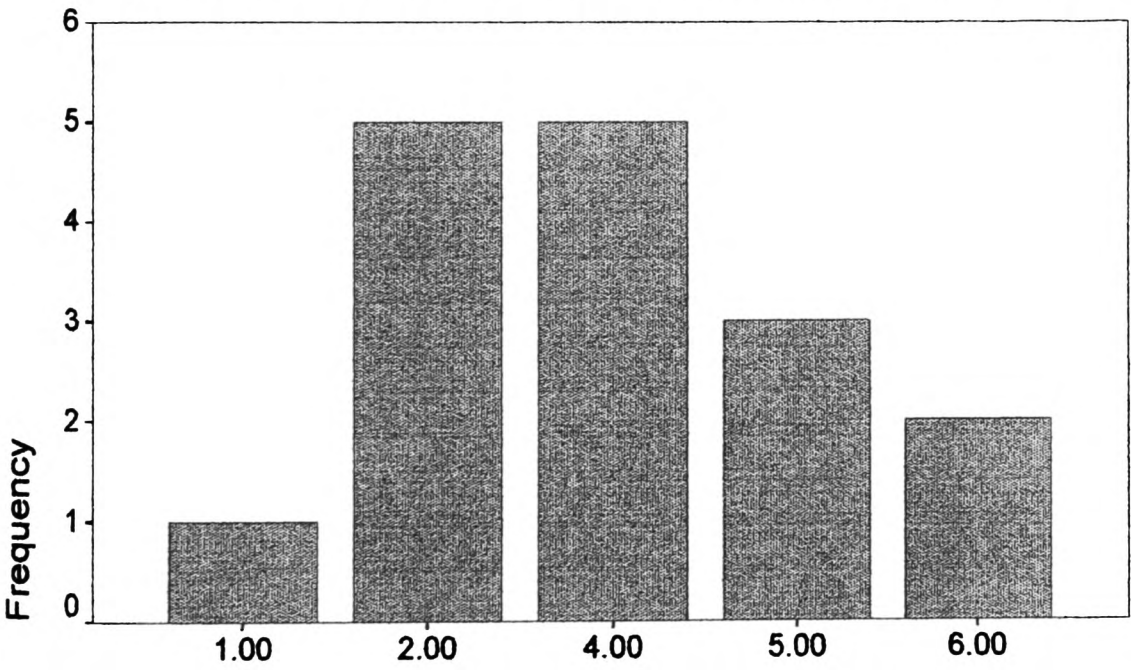
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q9

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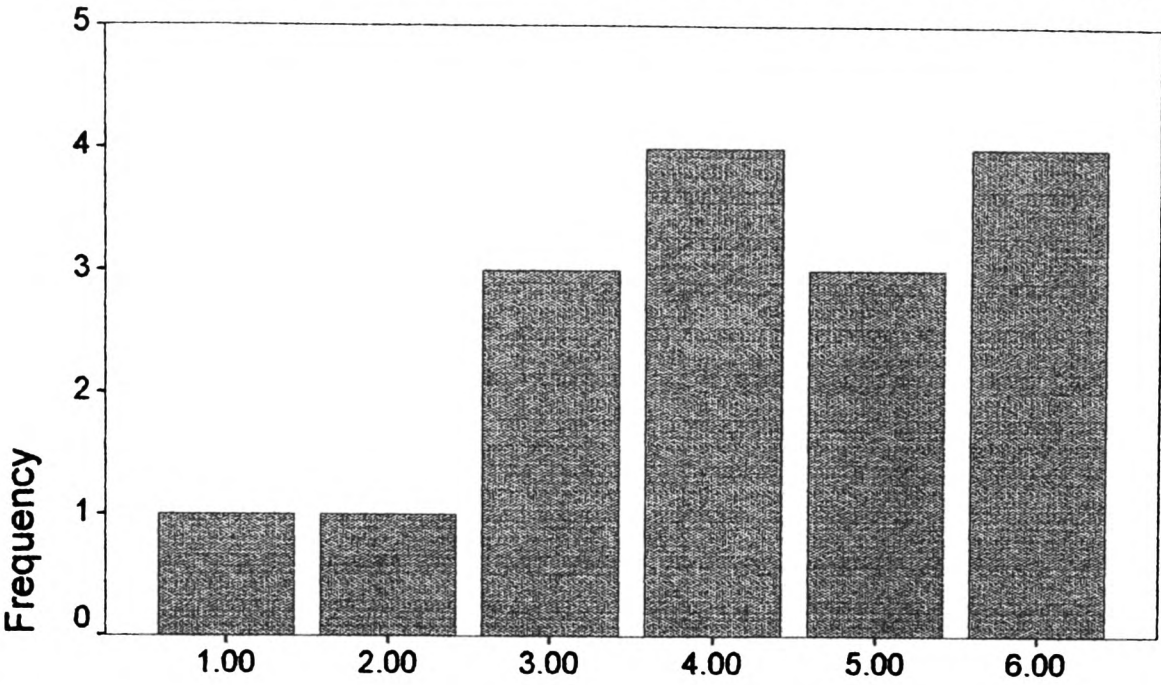
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q10

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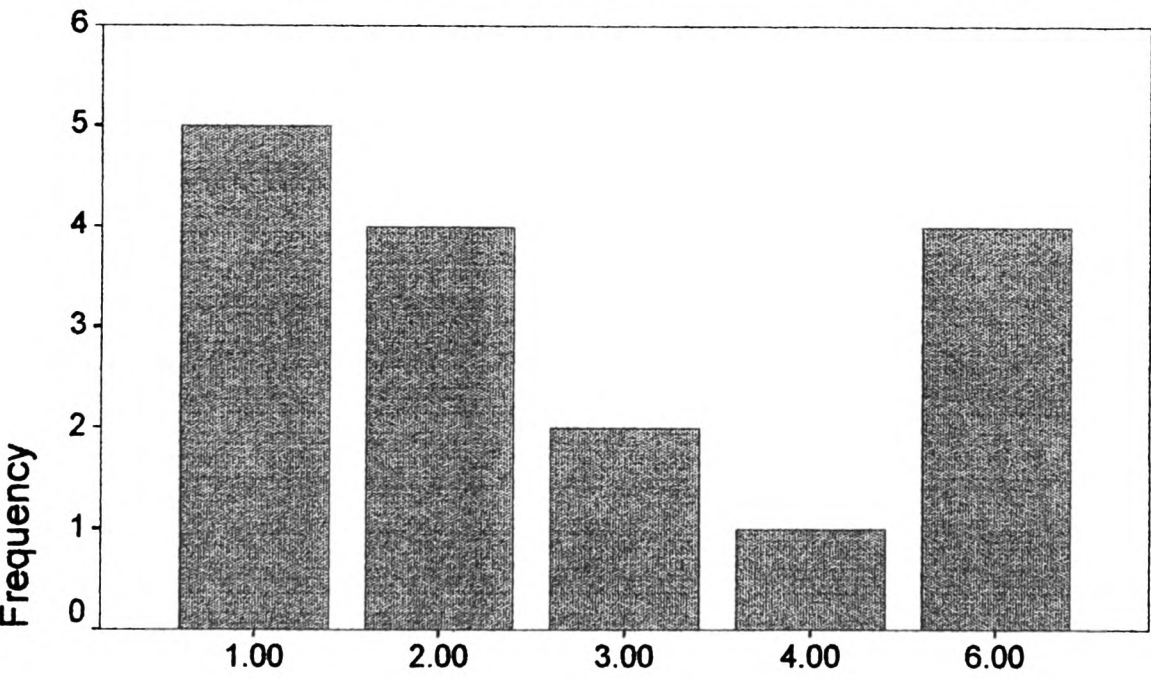
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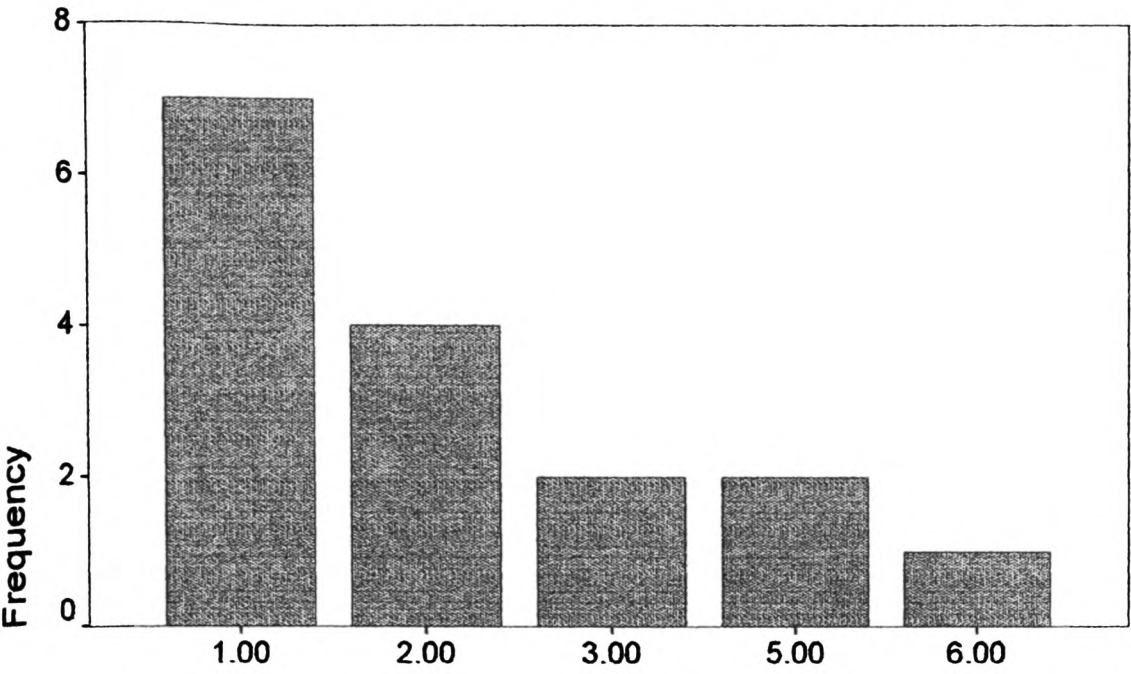
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q12

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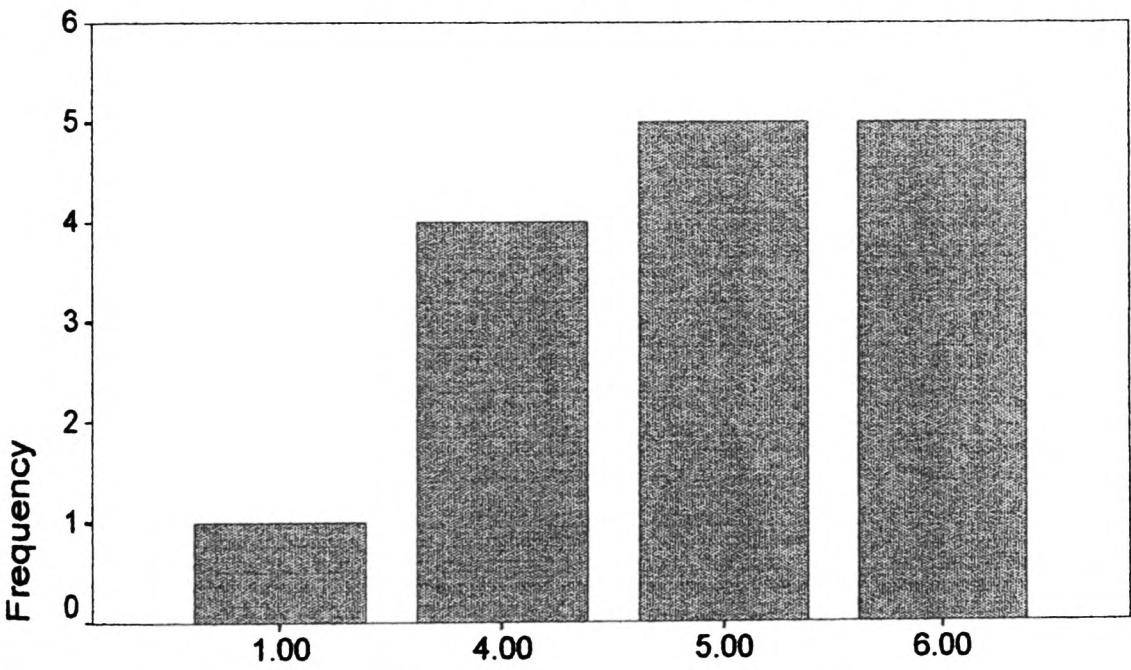
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q13

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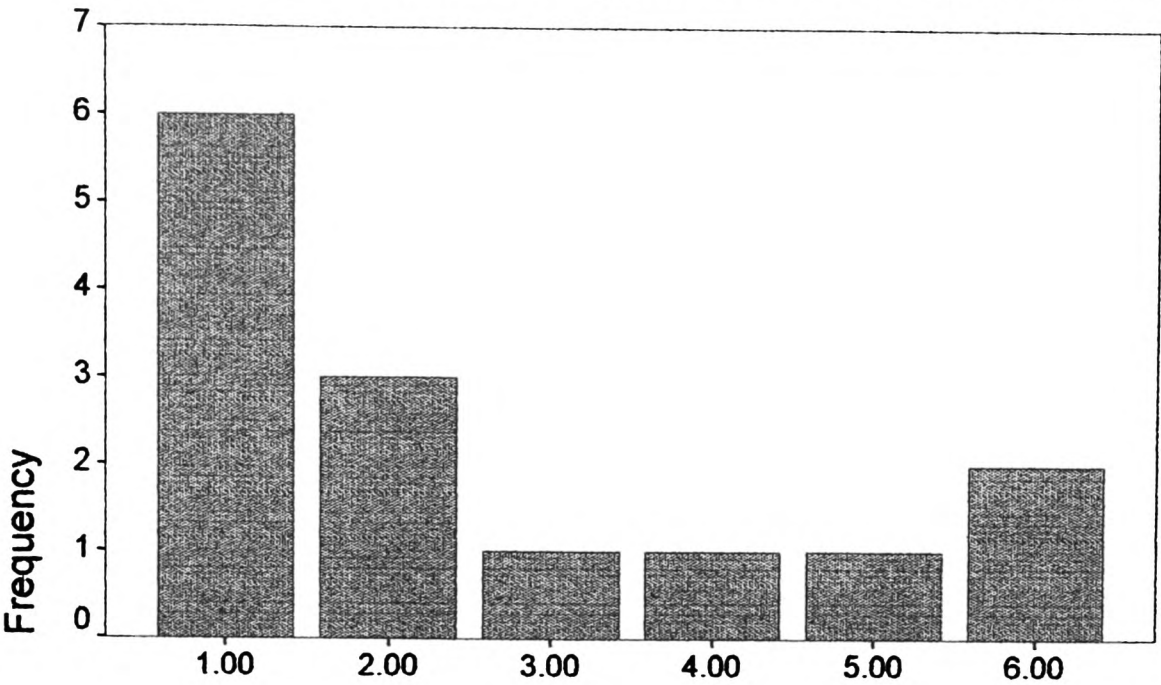
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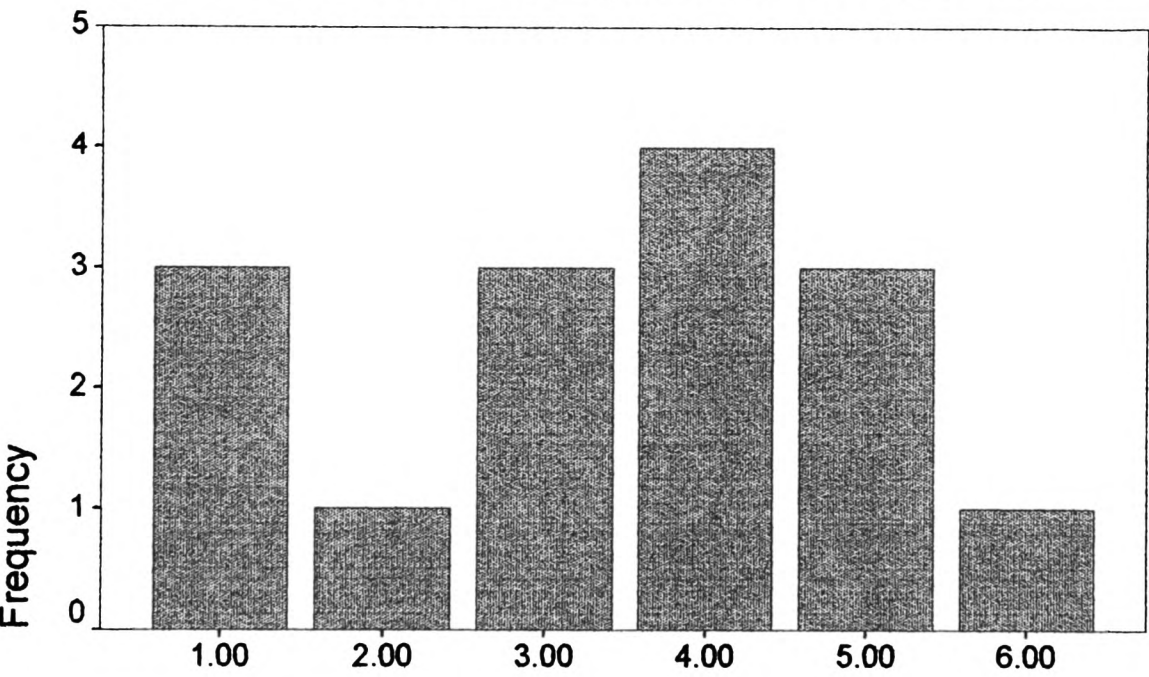
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q15

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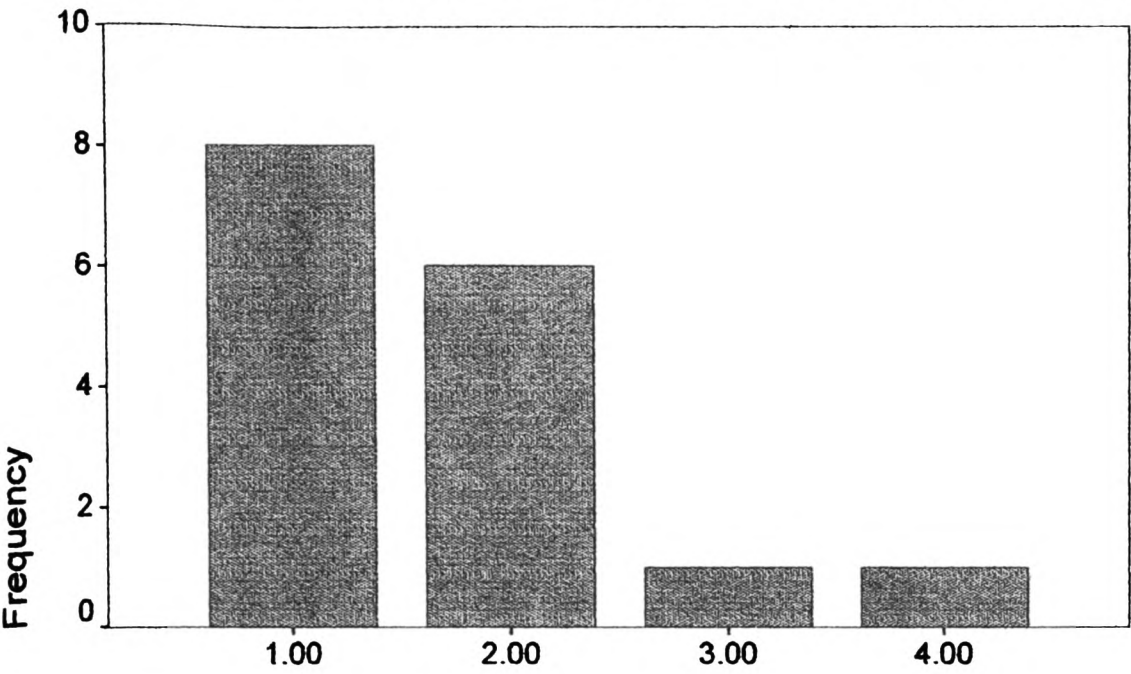
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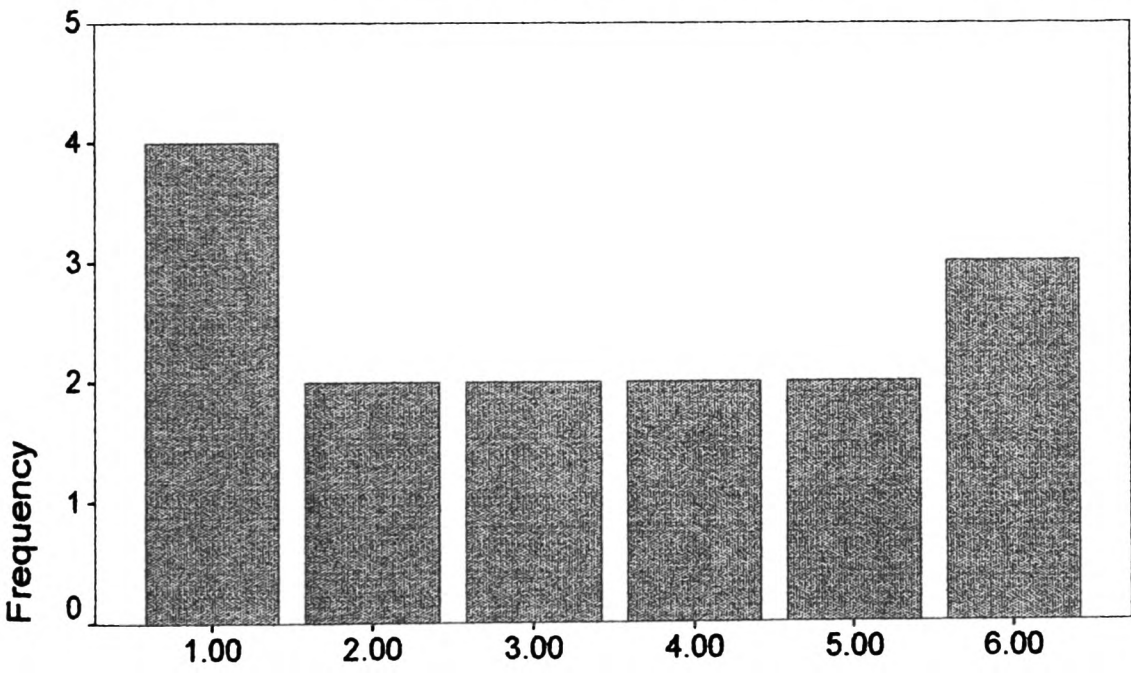
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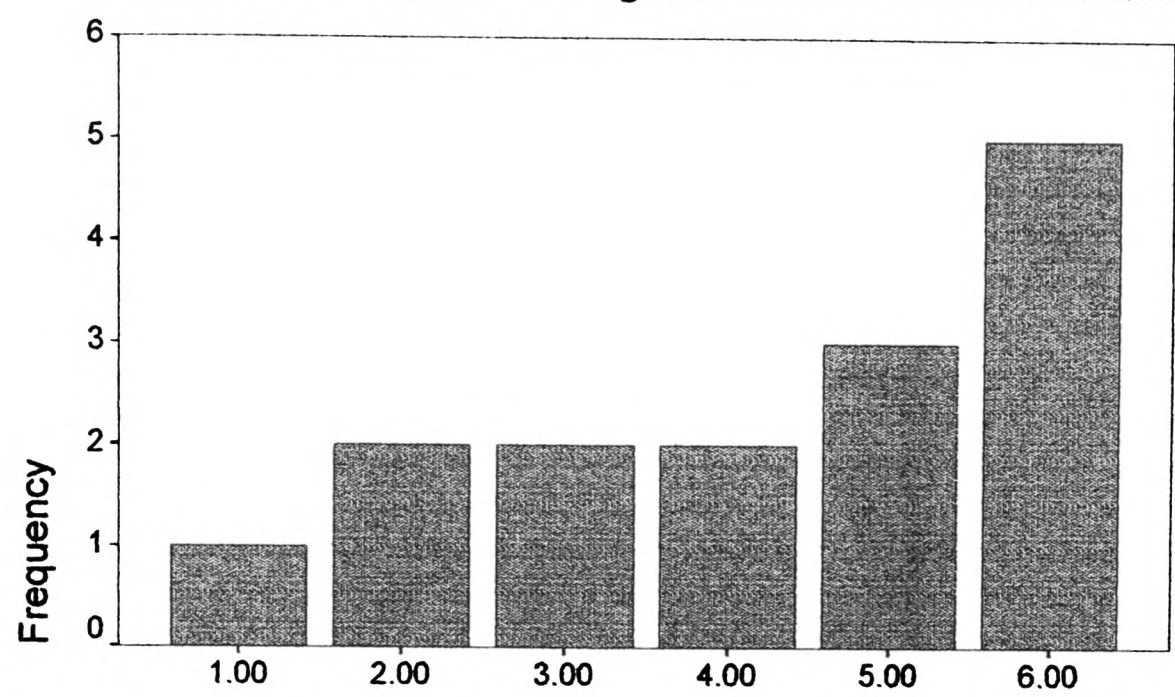
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q18

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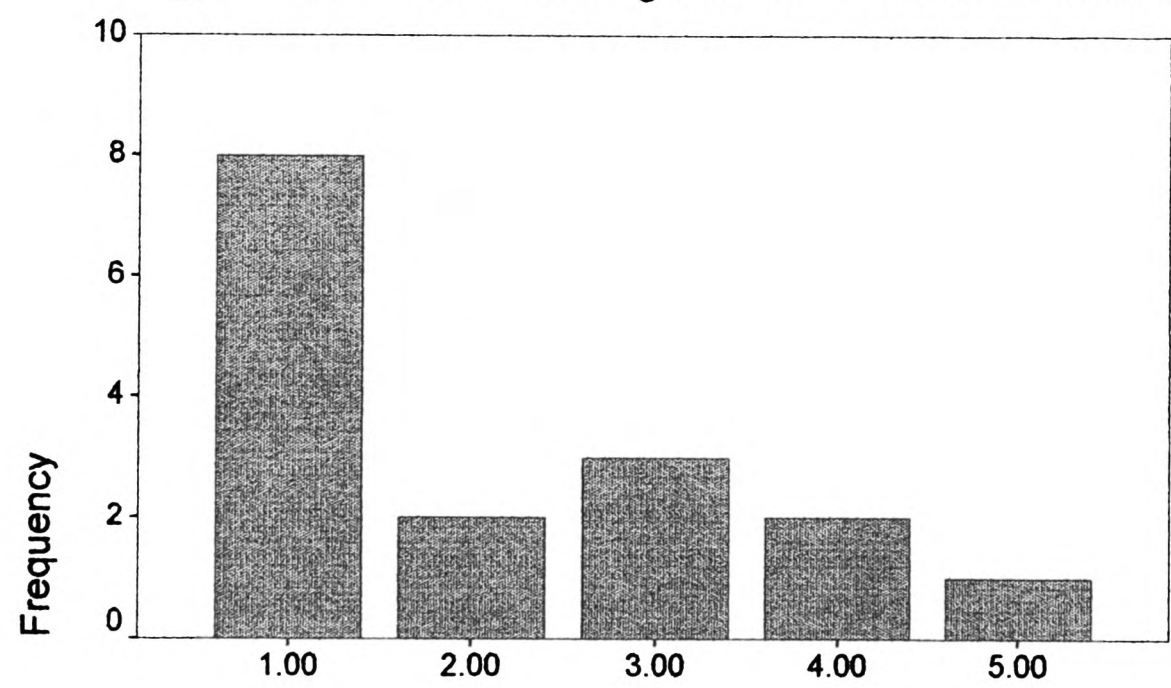
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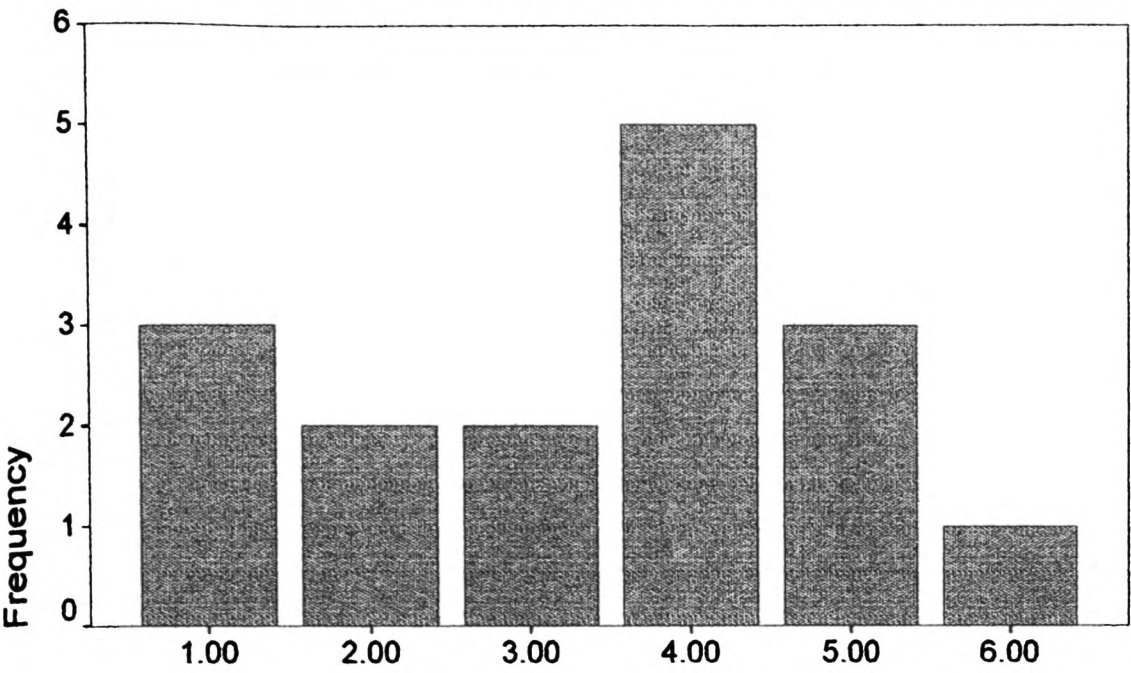
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q20

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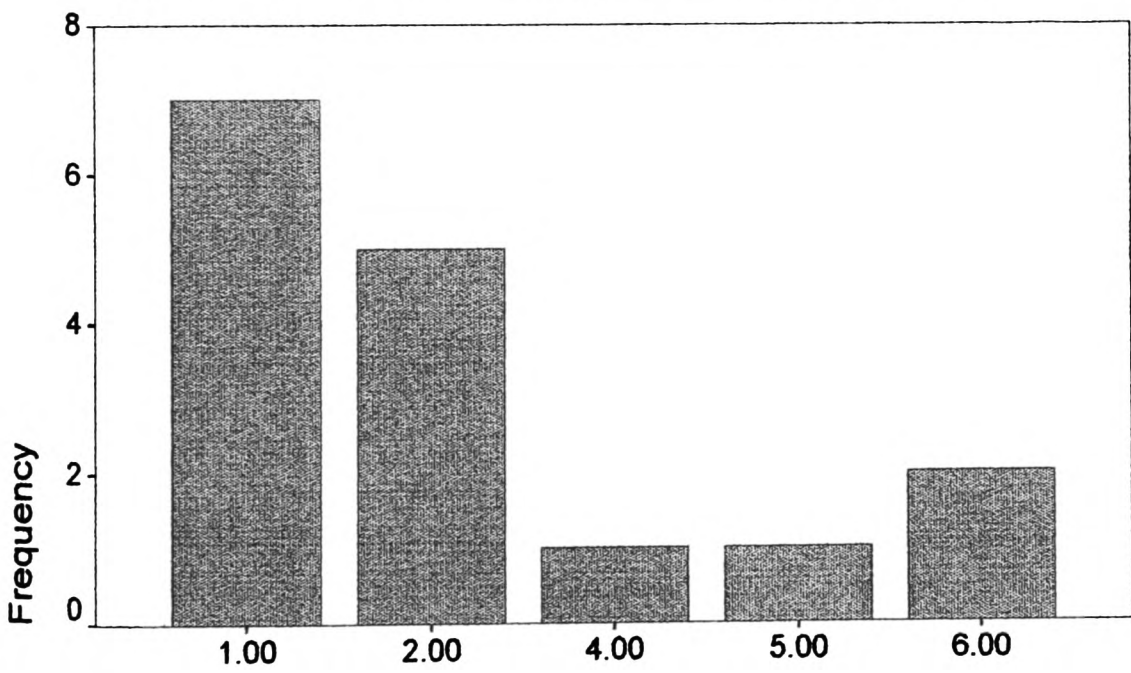
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q21

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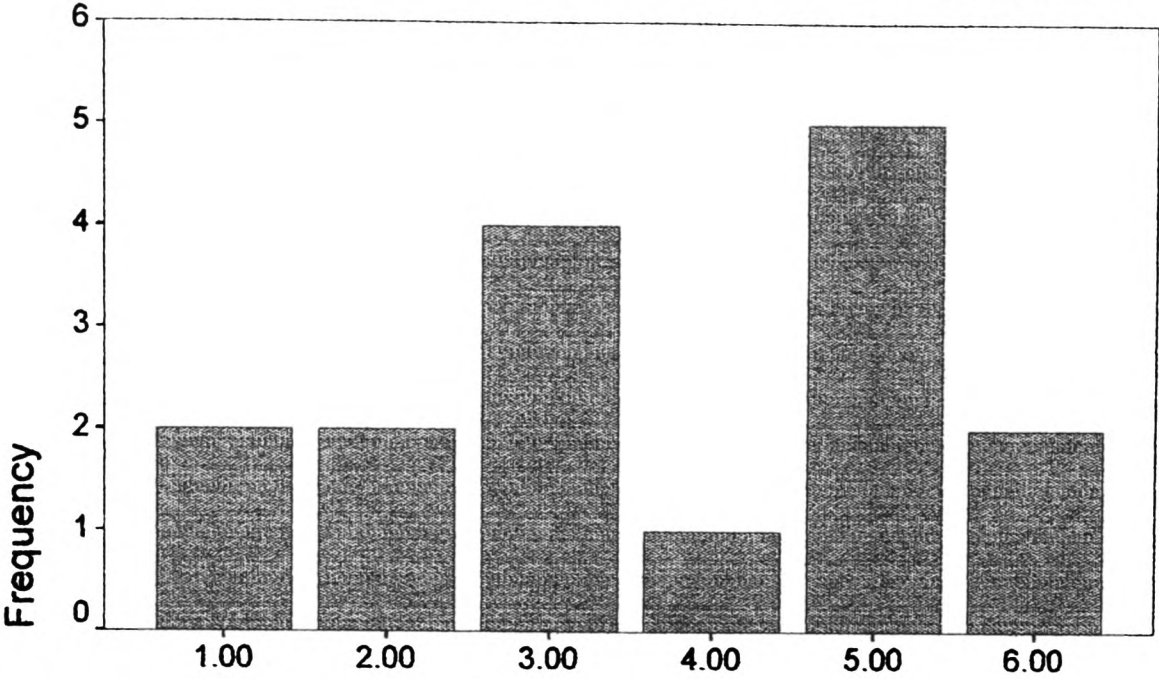
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q22

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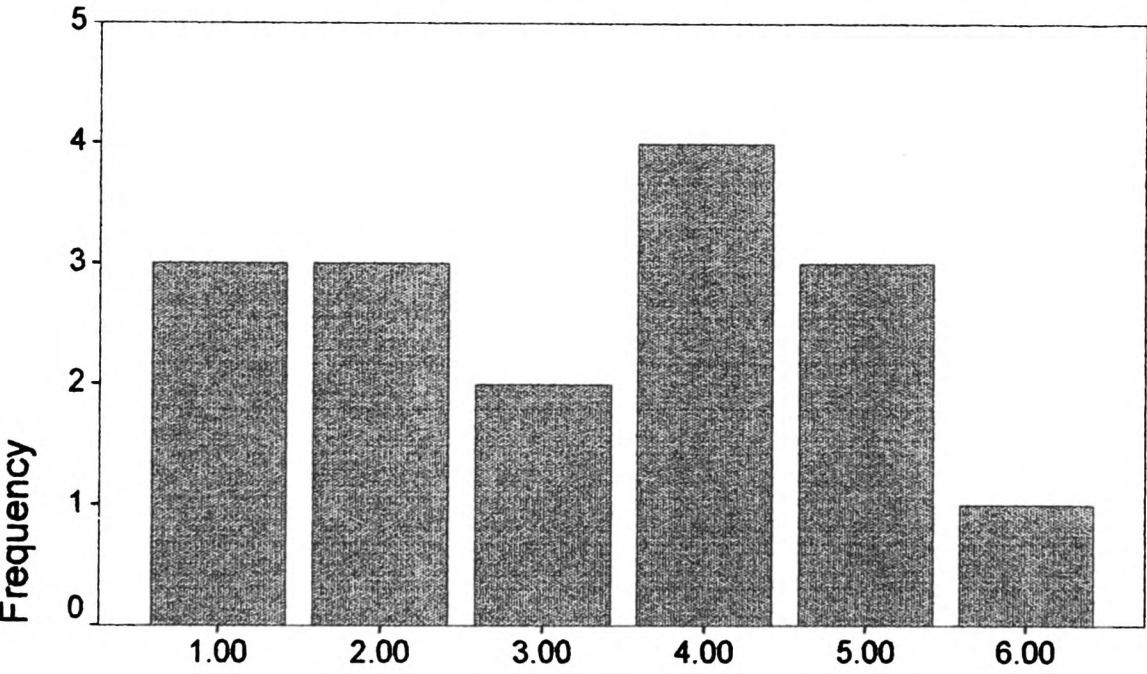
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q23

q24

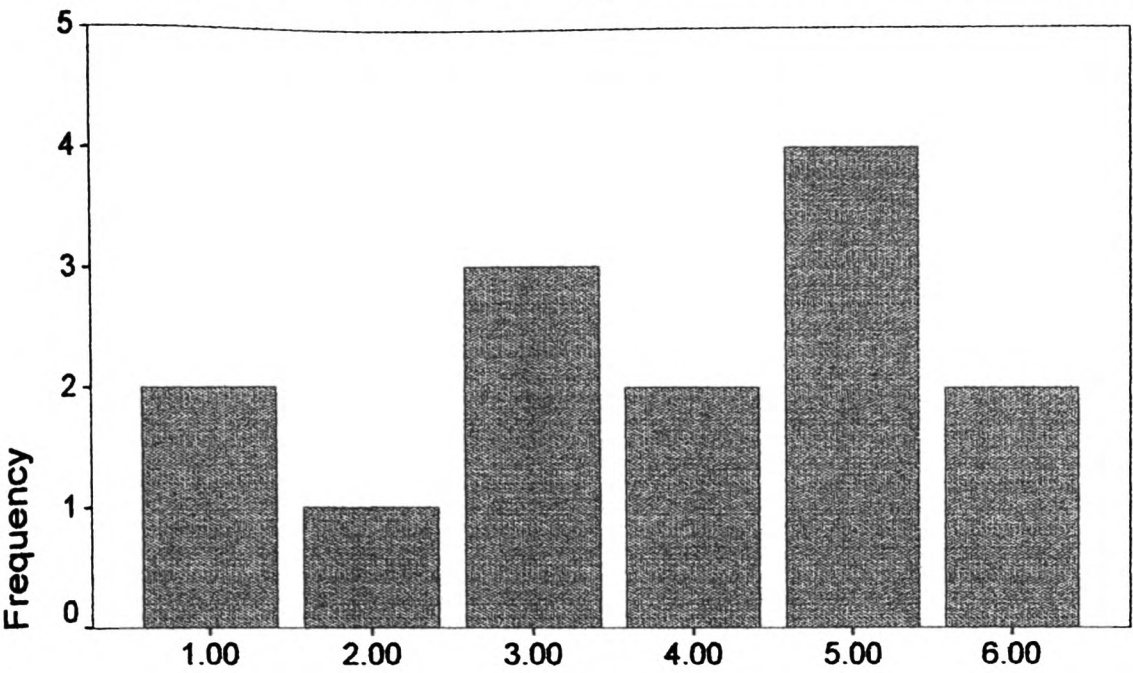
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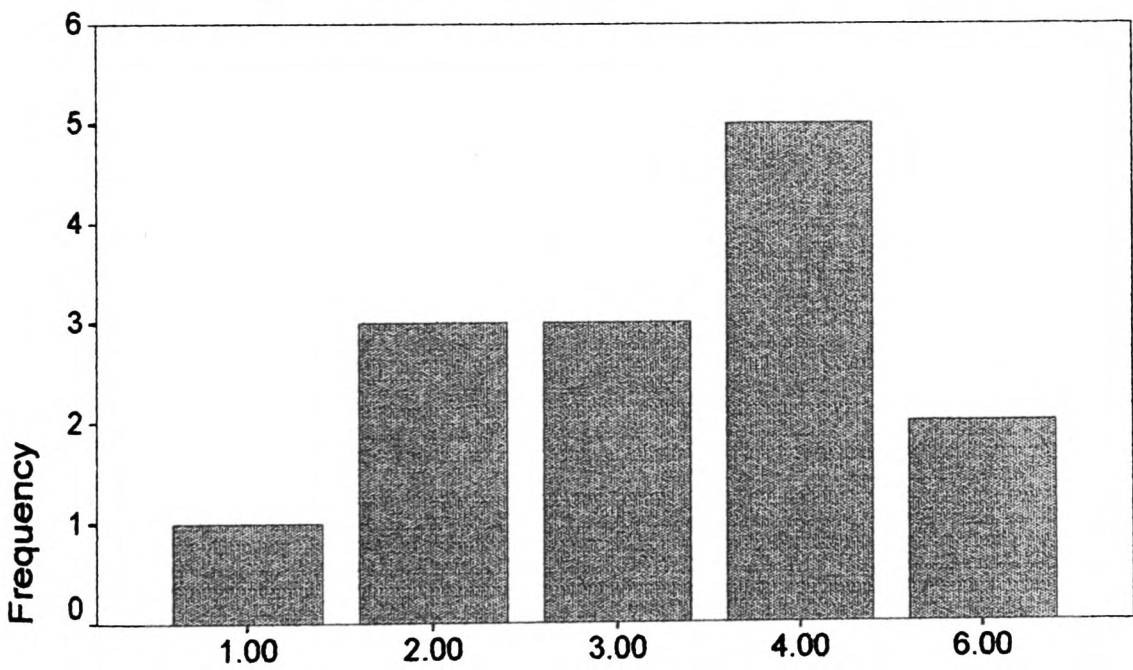
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q25

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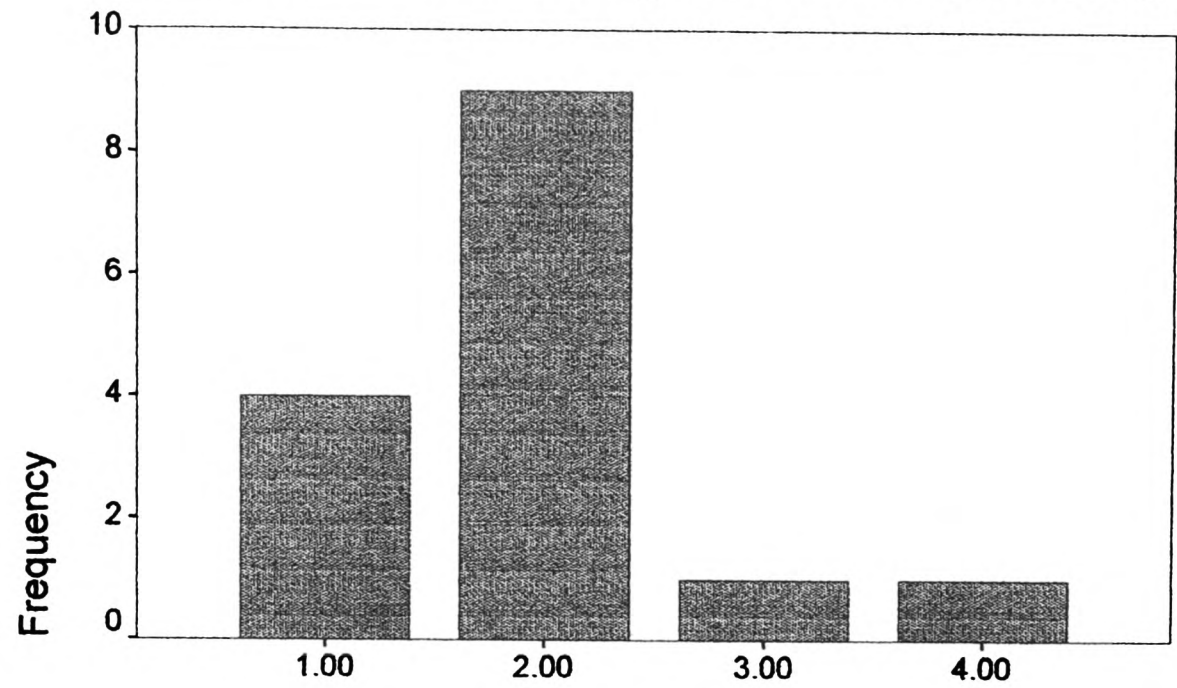
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q26

q27

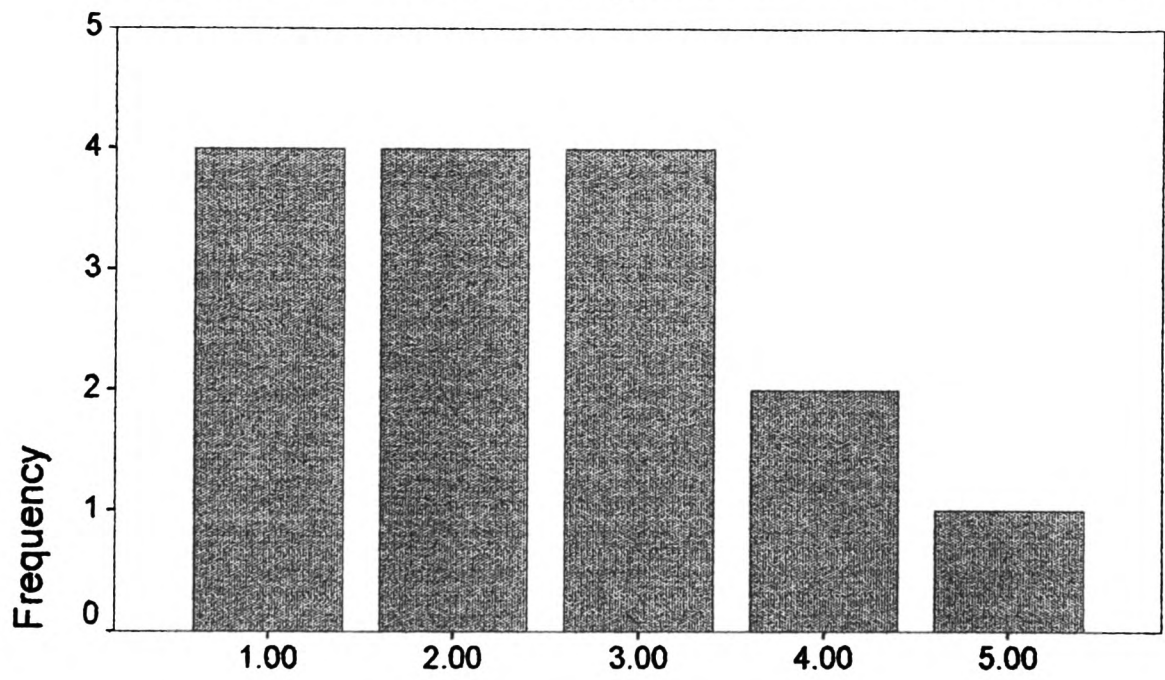
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q27

q28

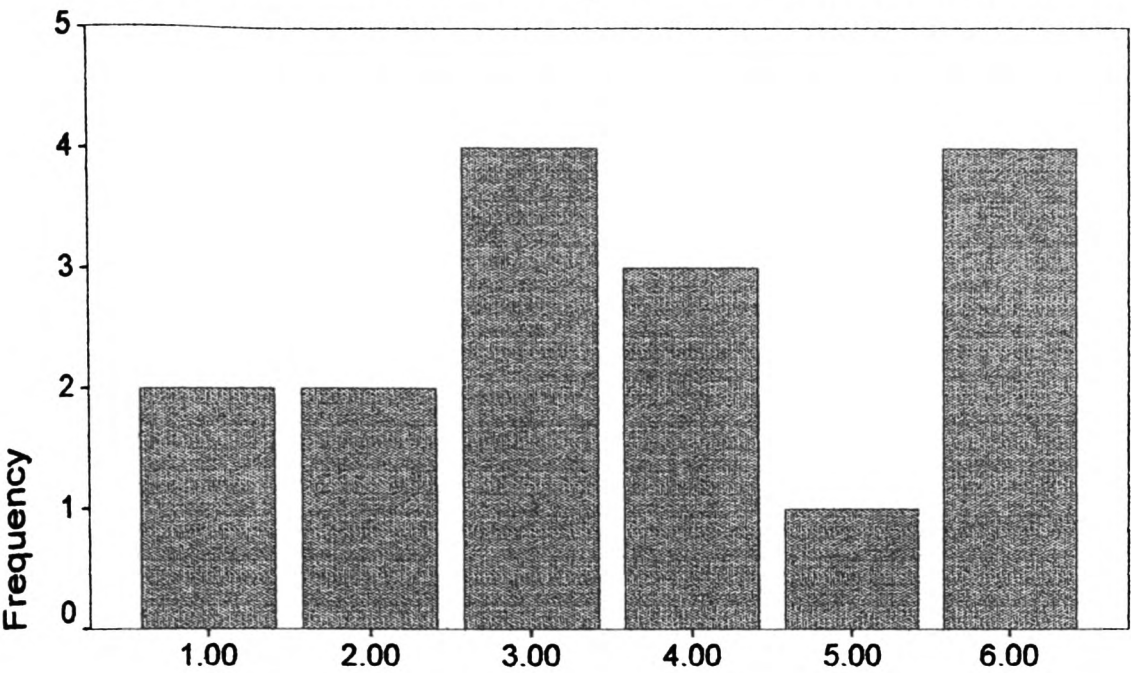
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q28

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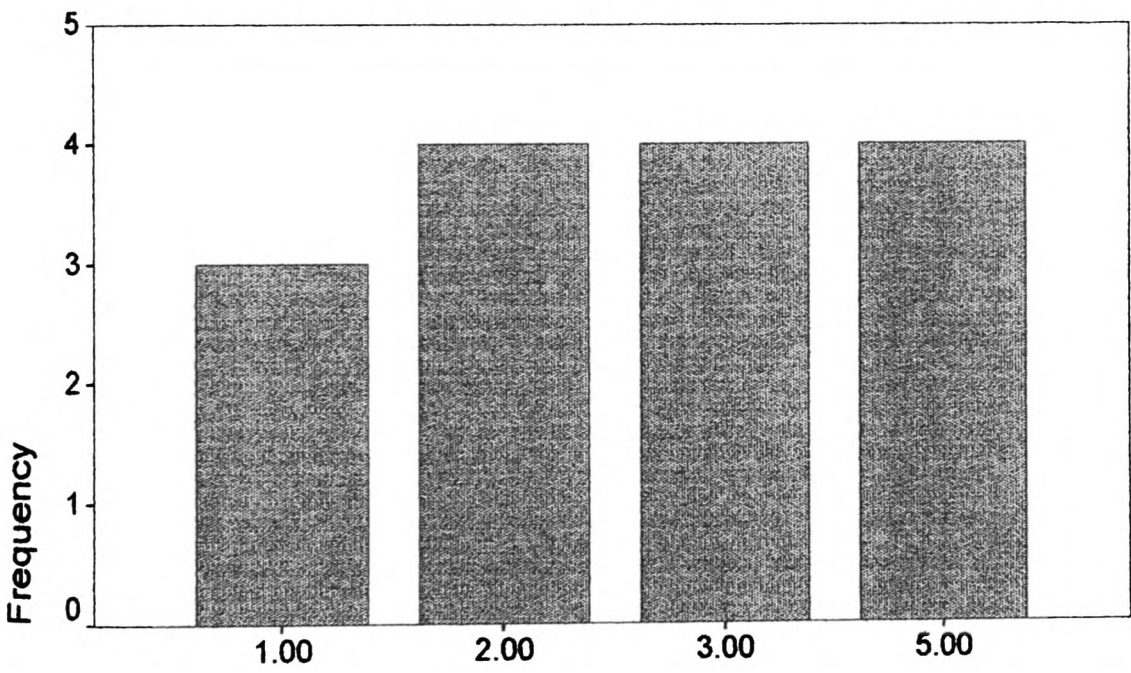
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q29

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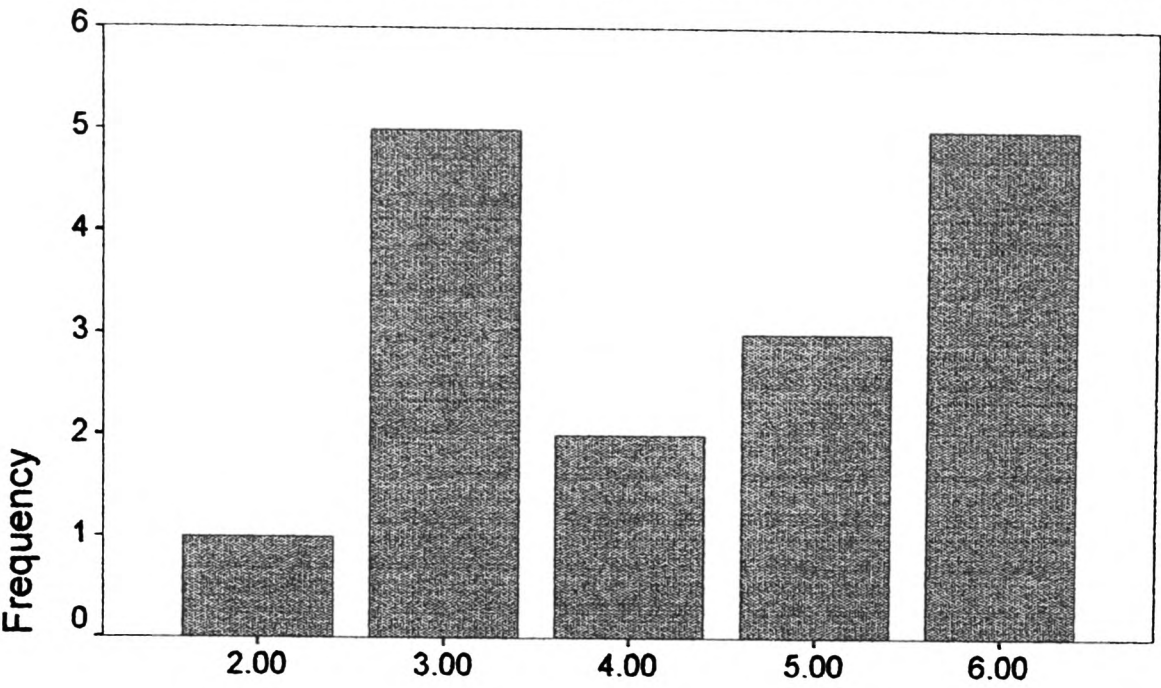
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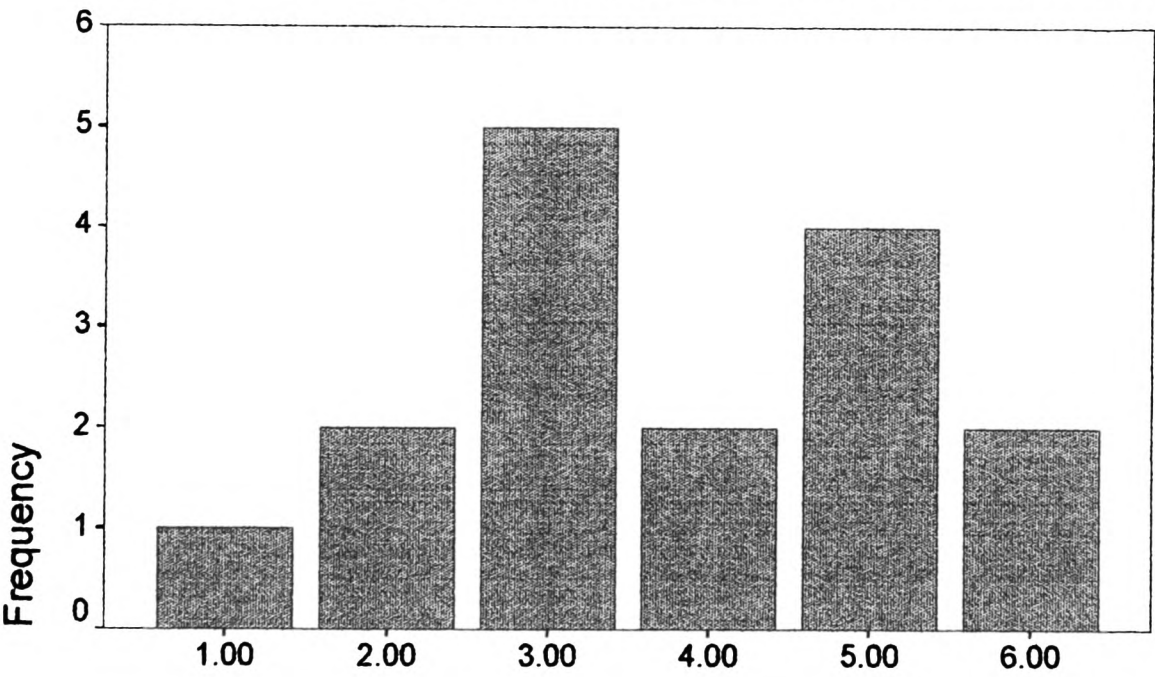
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q31

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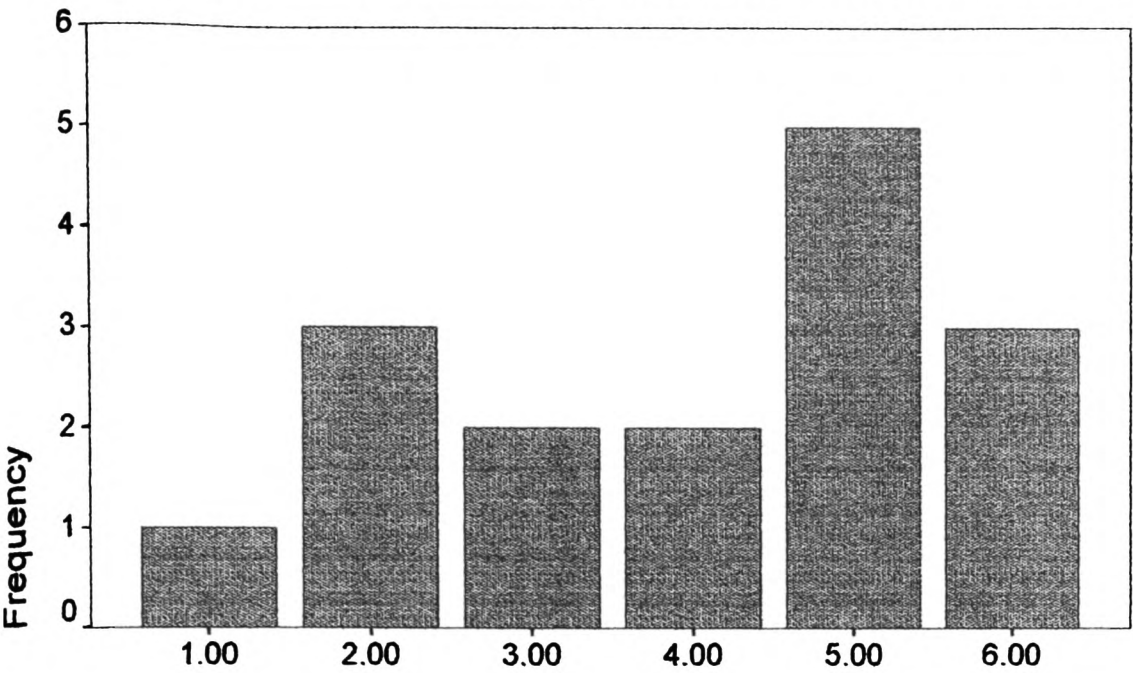
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q32

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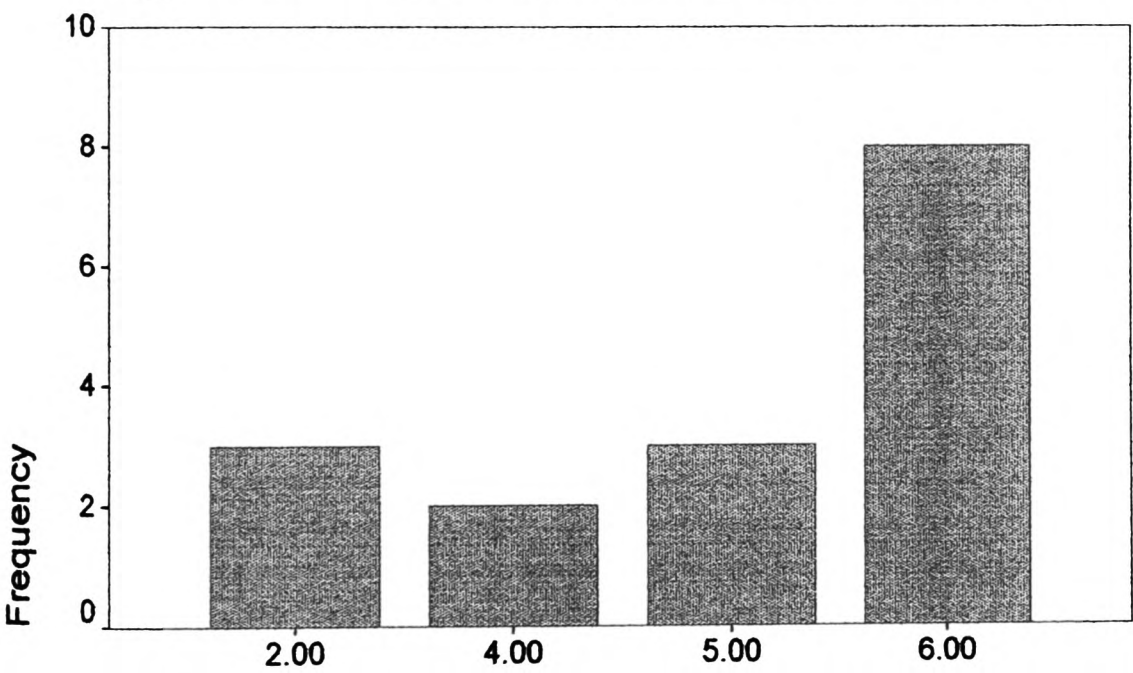
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q33

q34

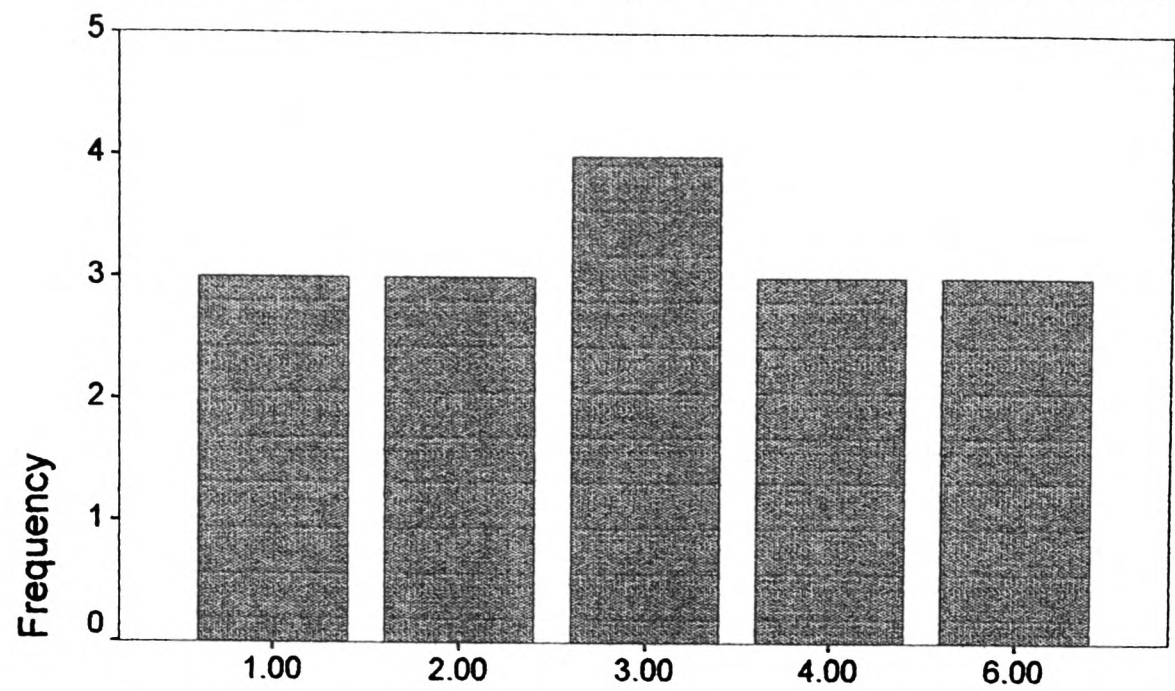
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q34

q35

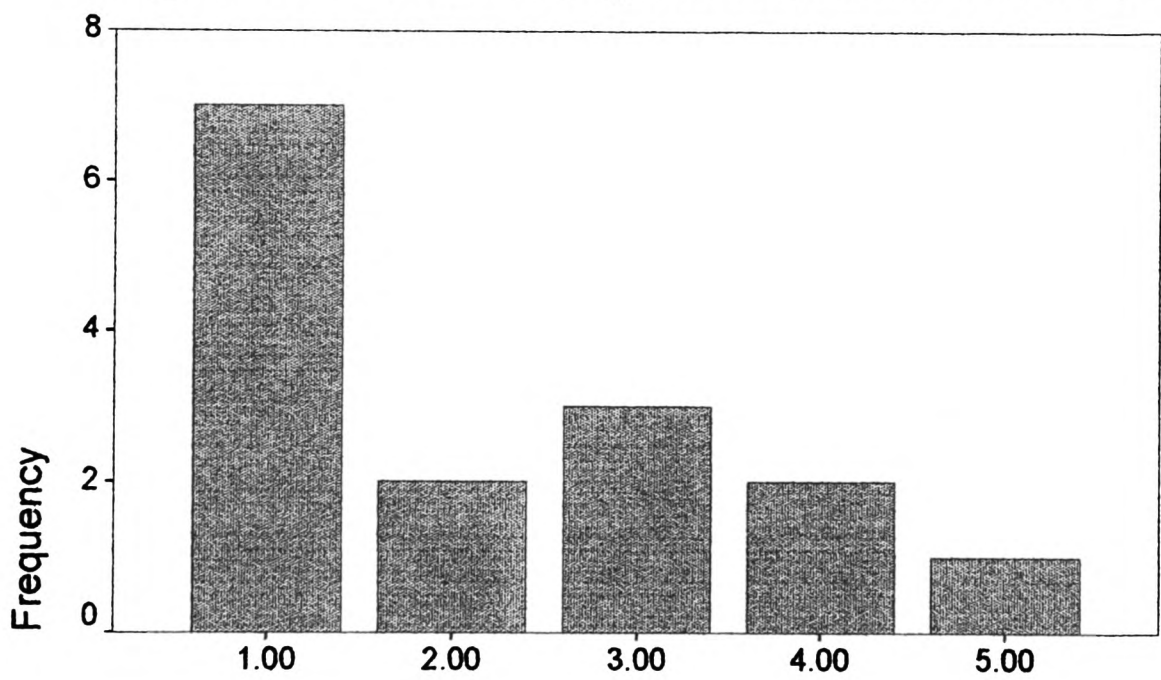
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q35

q36

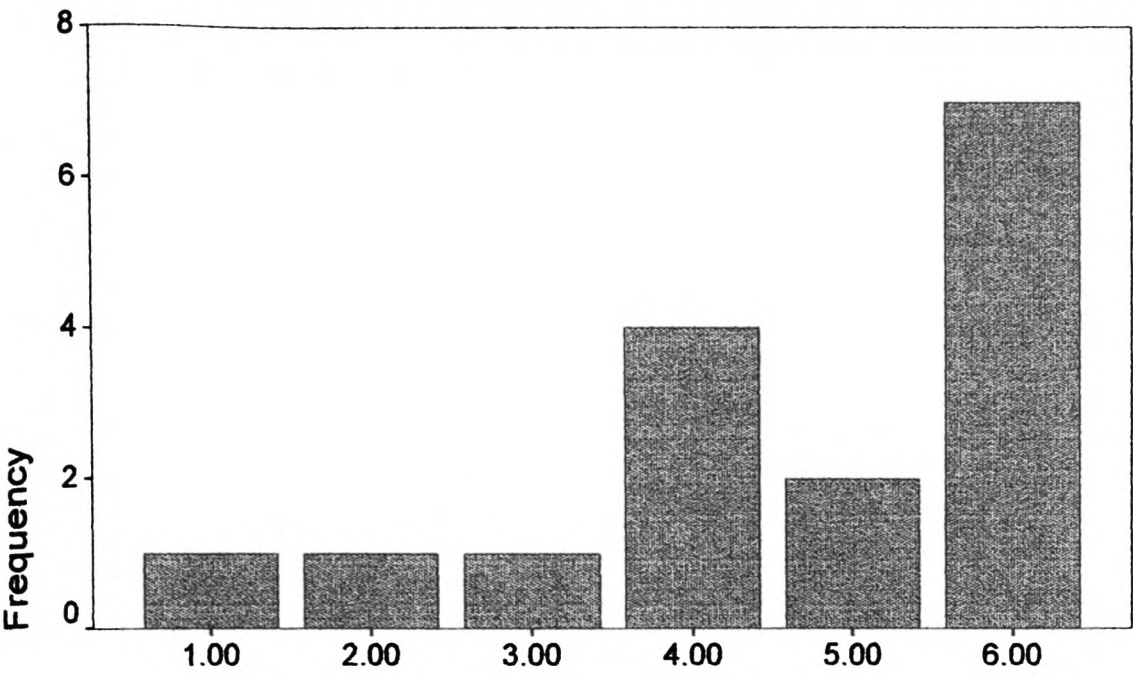
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q36

q37

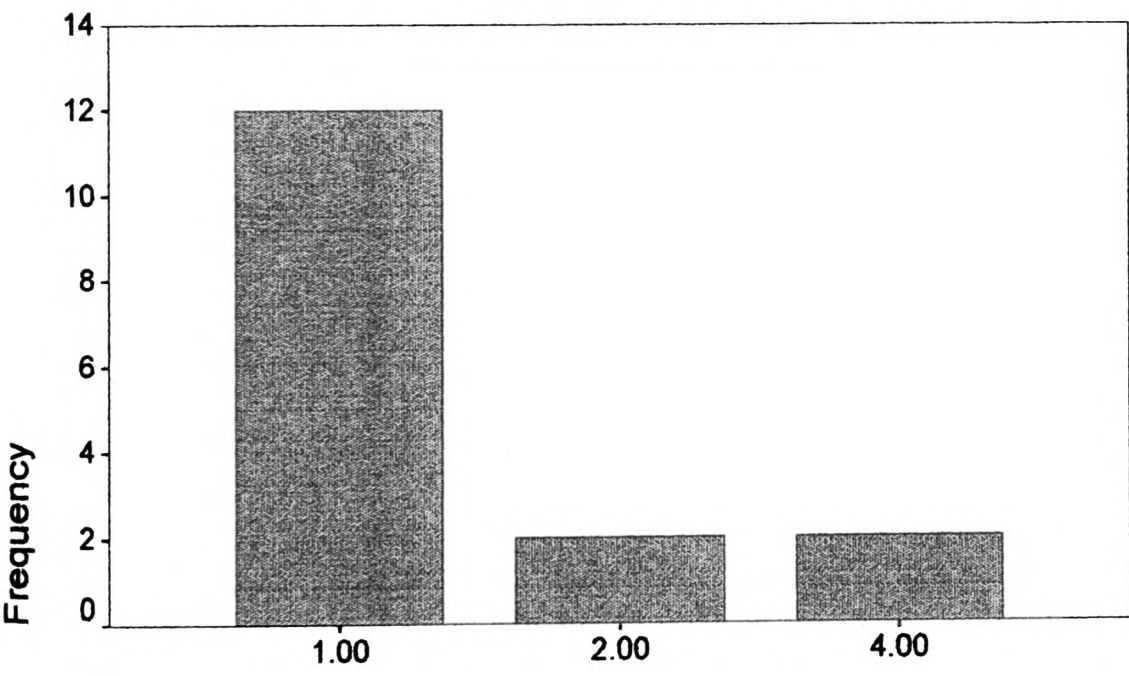
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q37

q38

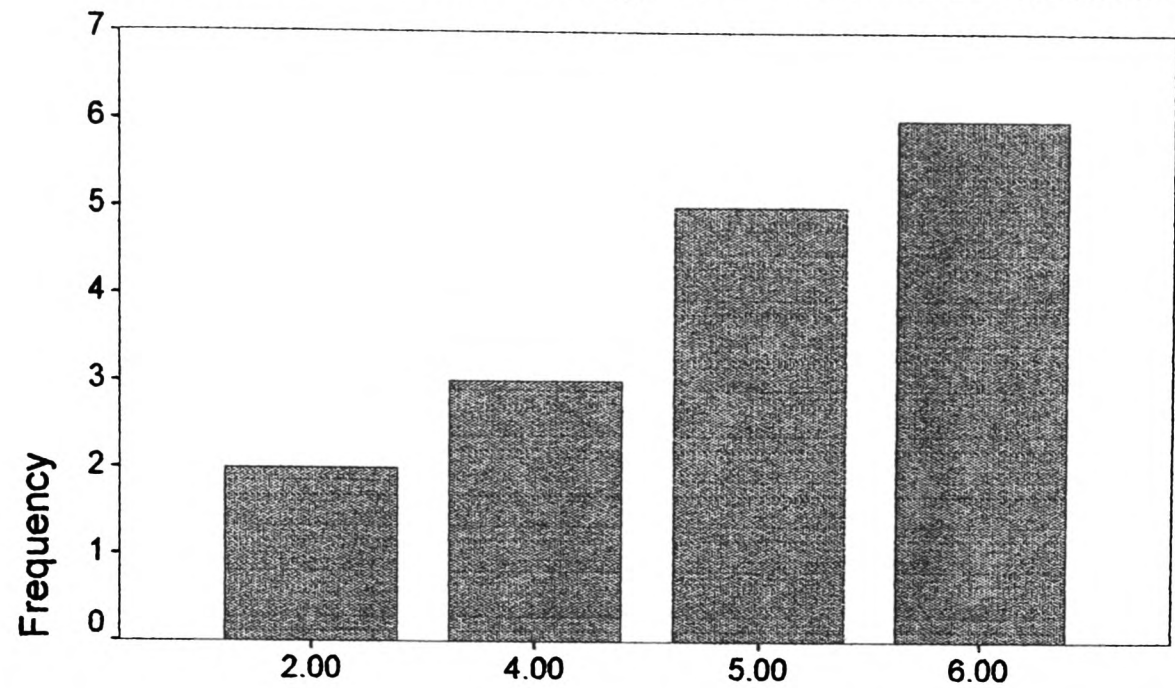
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q38

q39

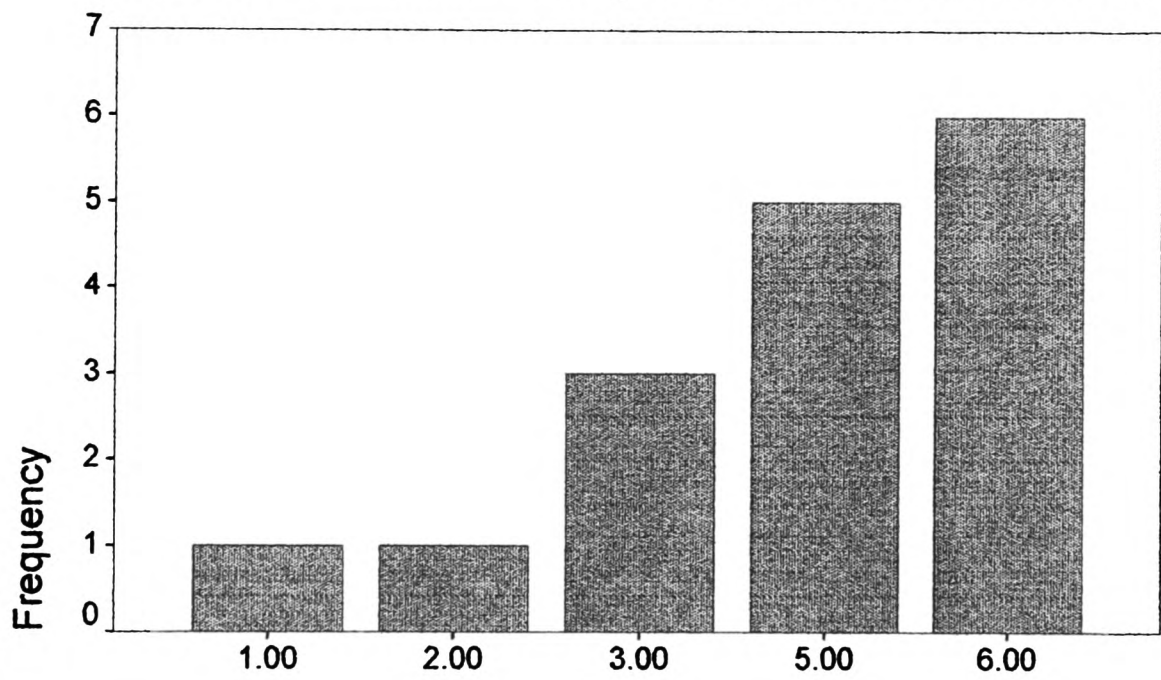
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q39

q40

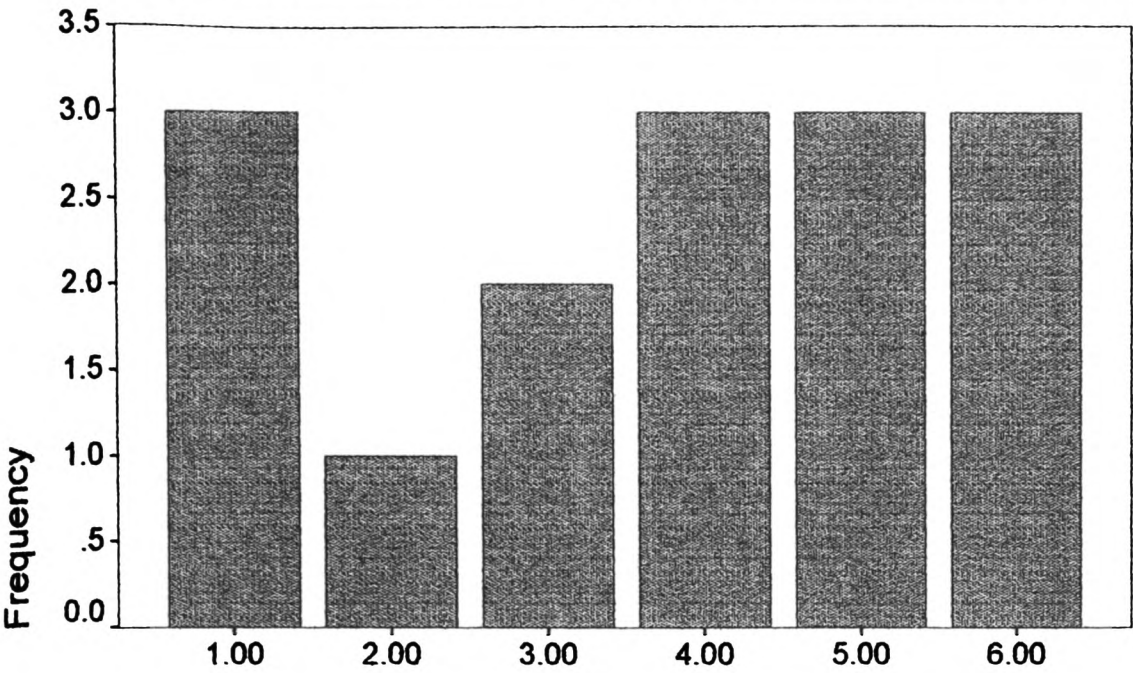
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q40

q41

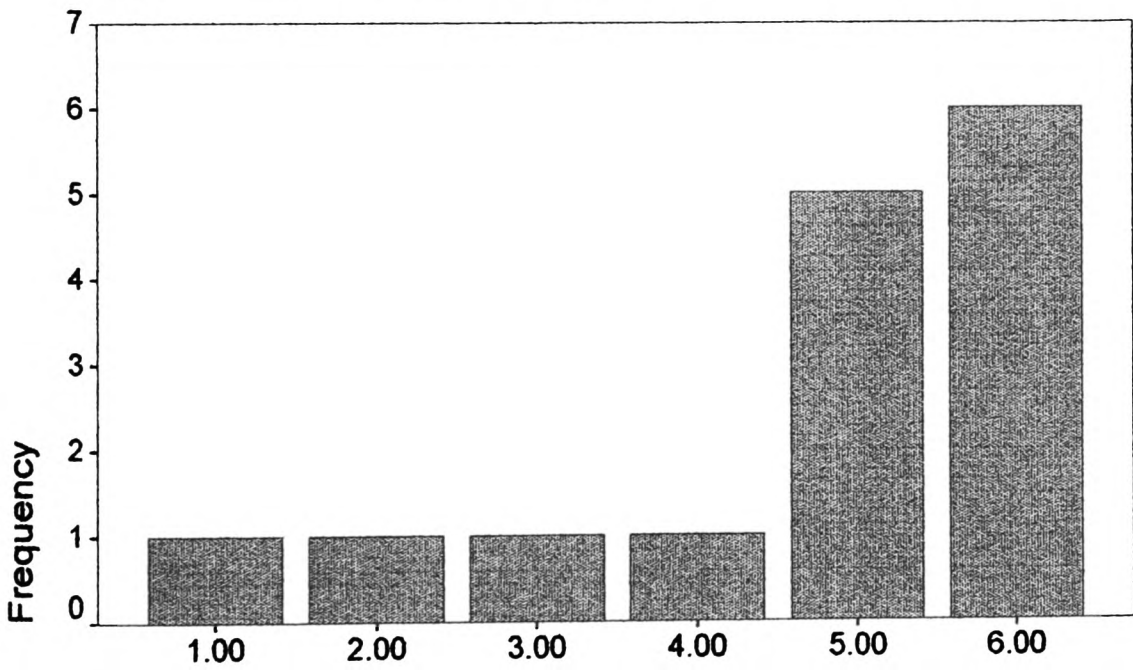
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q41

q42

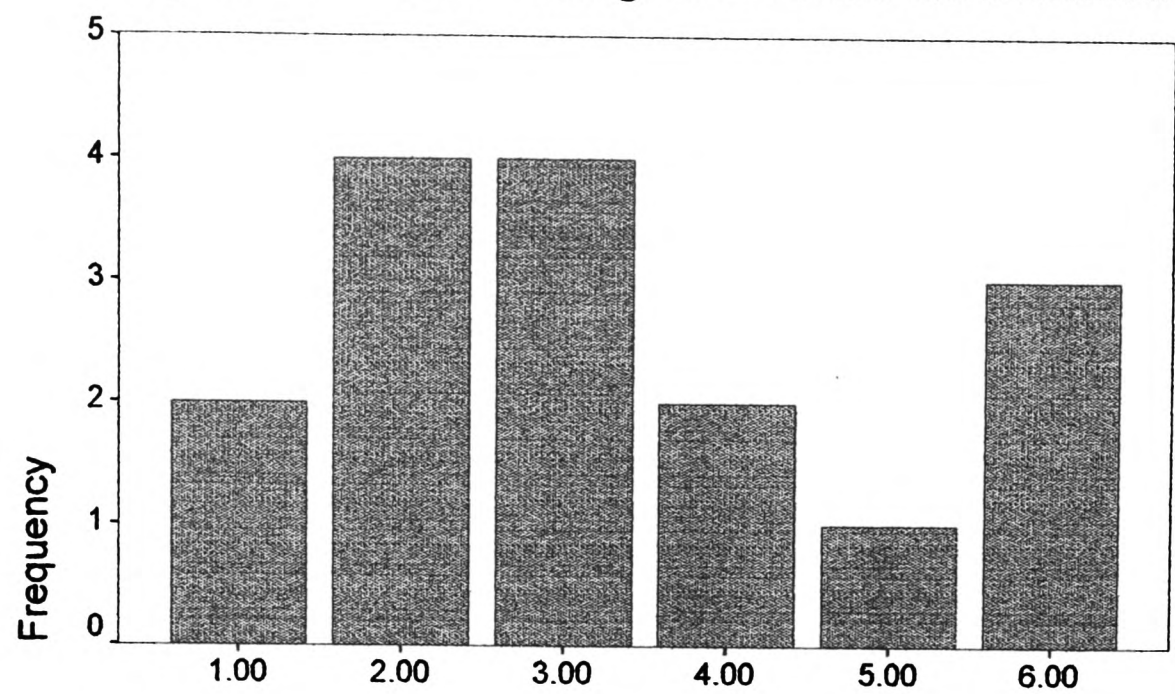
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q42

q43

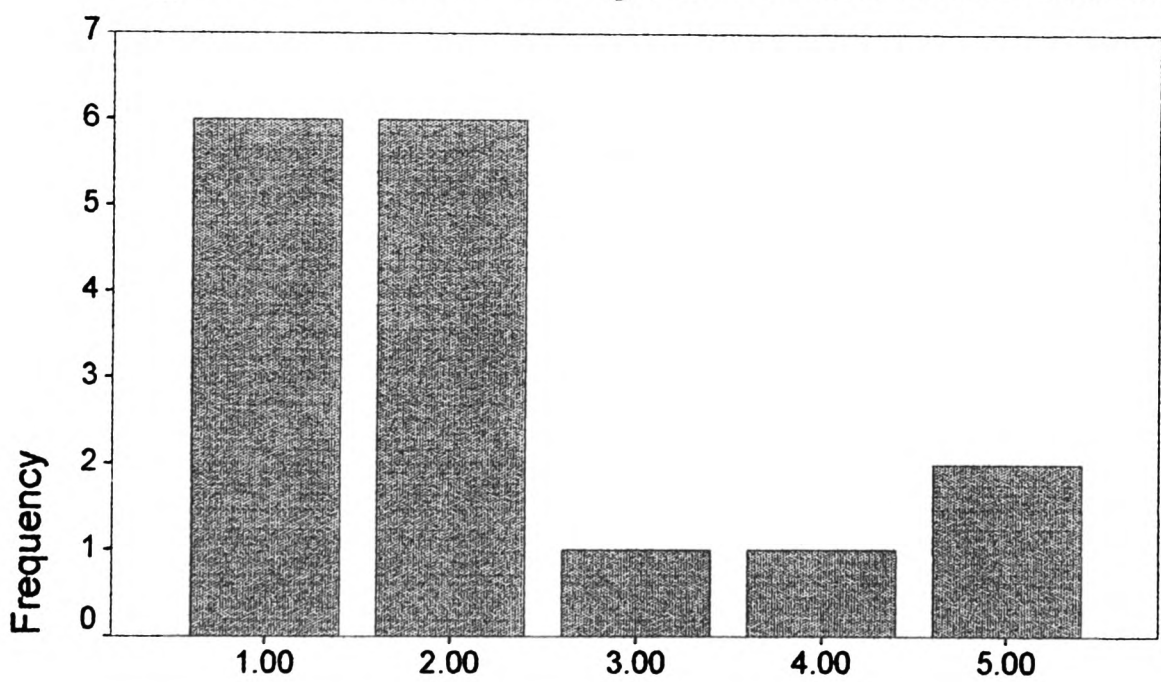
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q43

q44

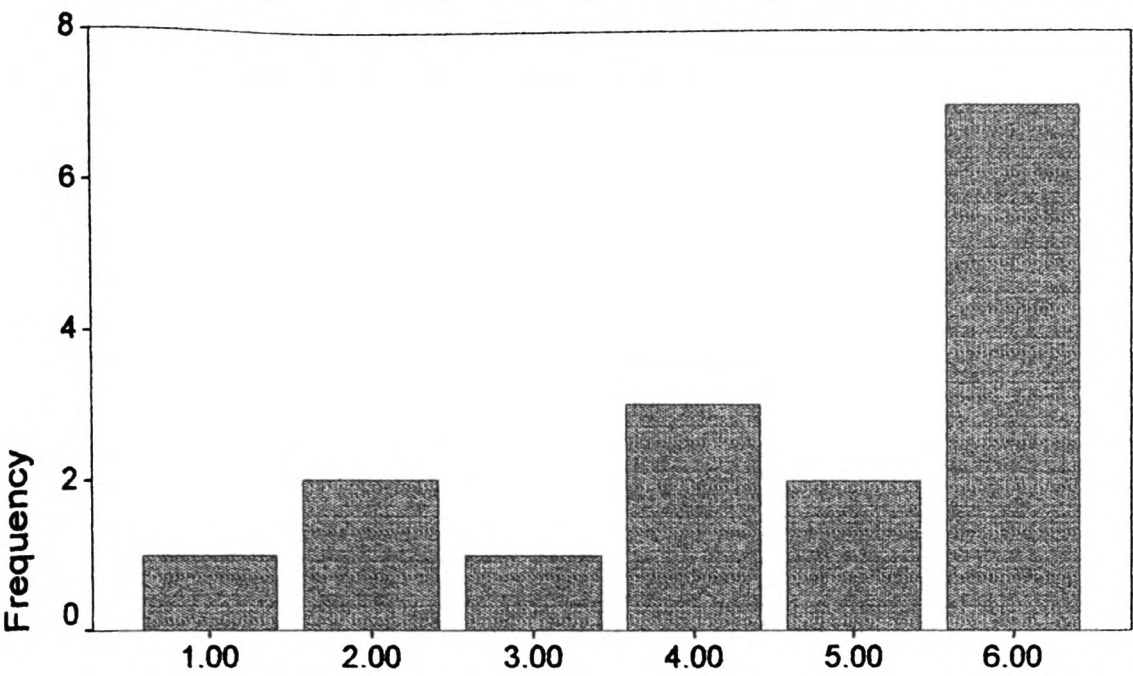
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q44

q45

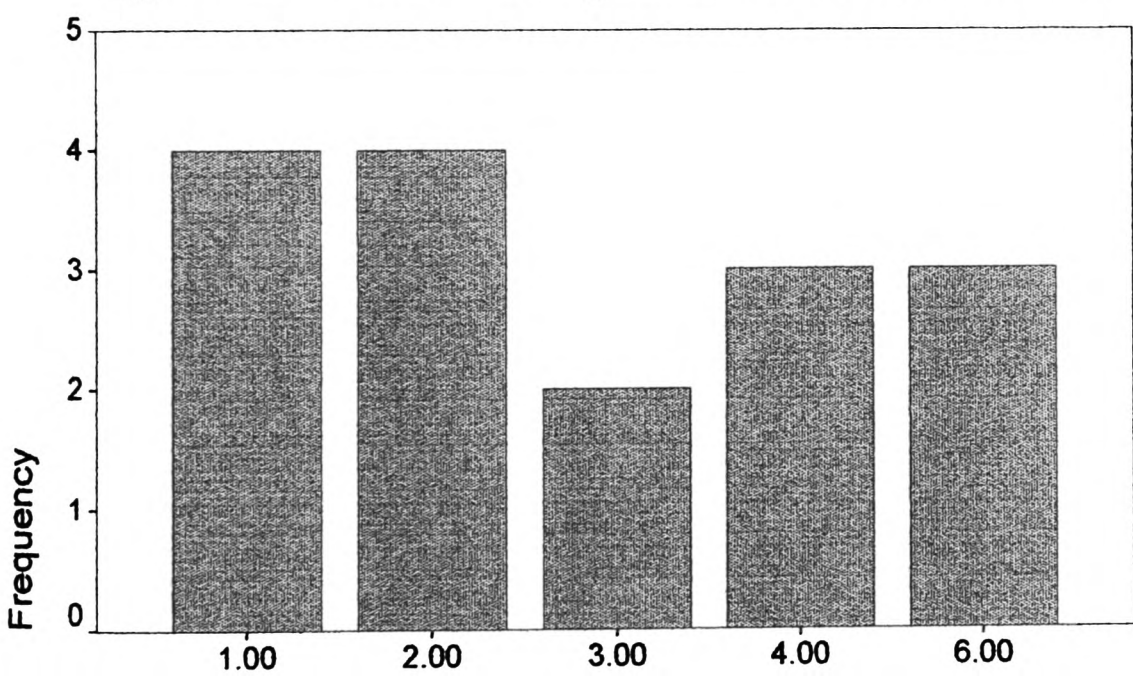
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q45

q46

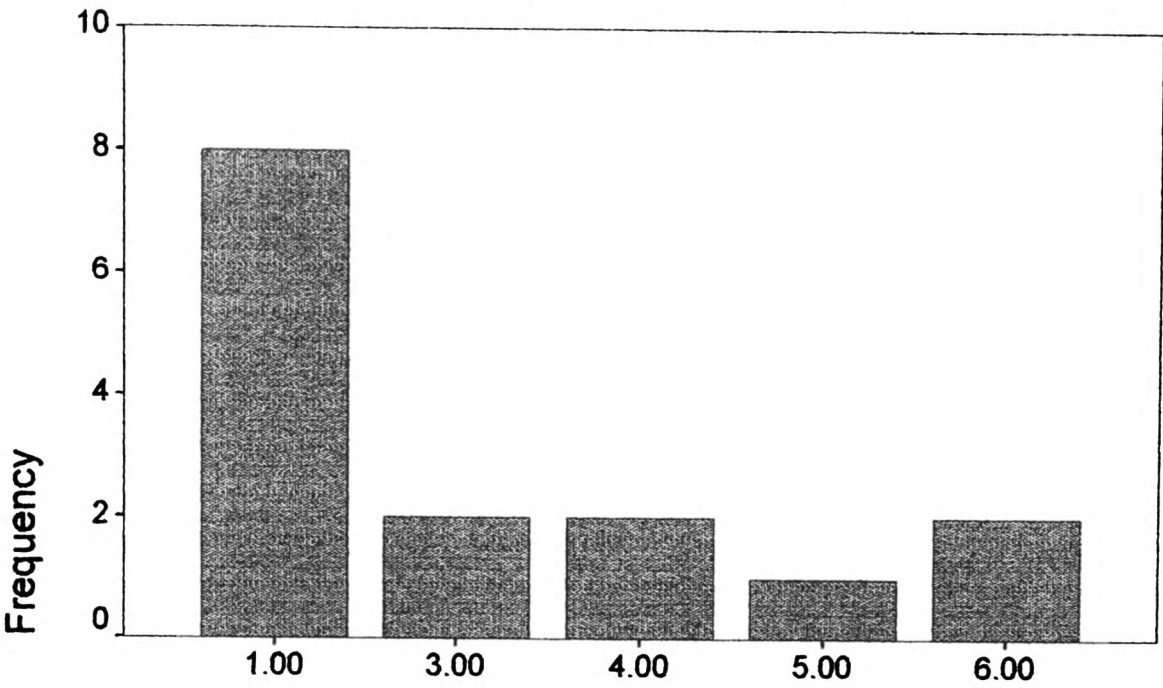
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q46

q47

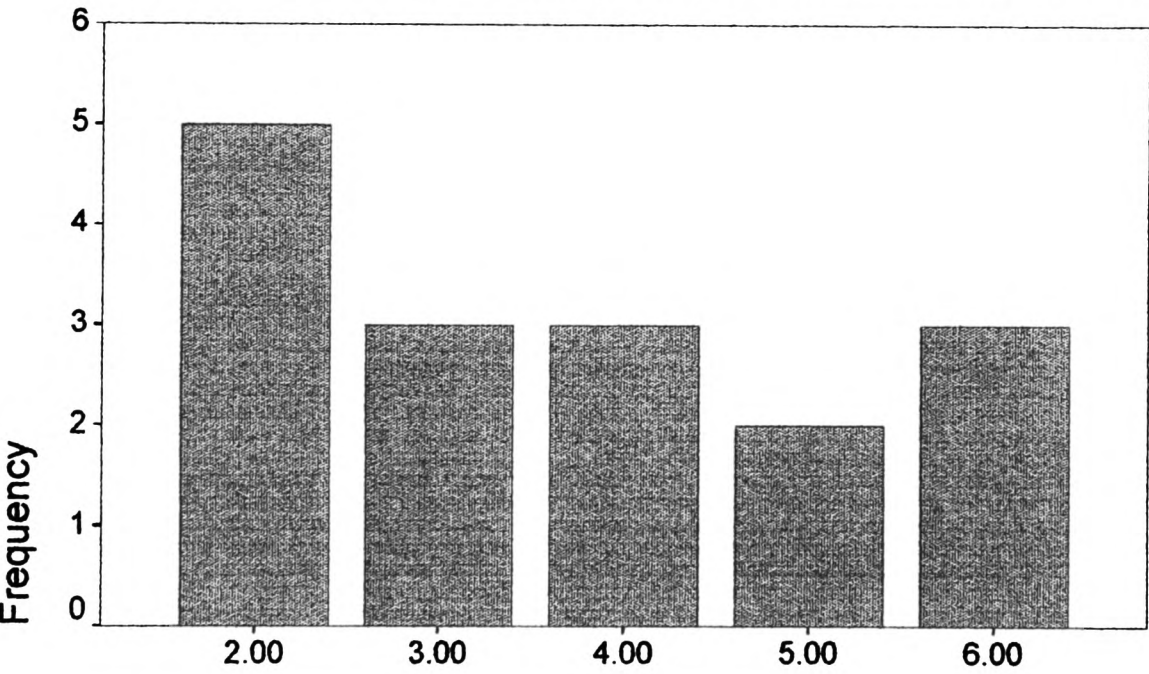
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q47

q48

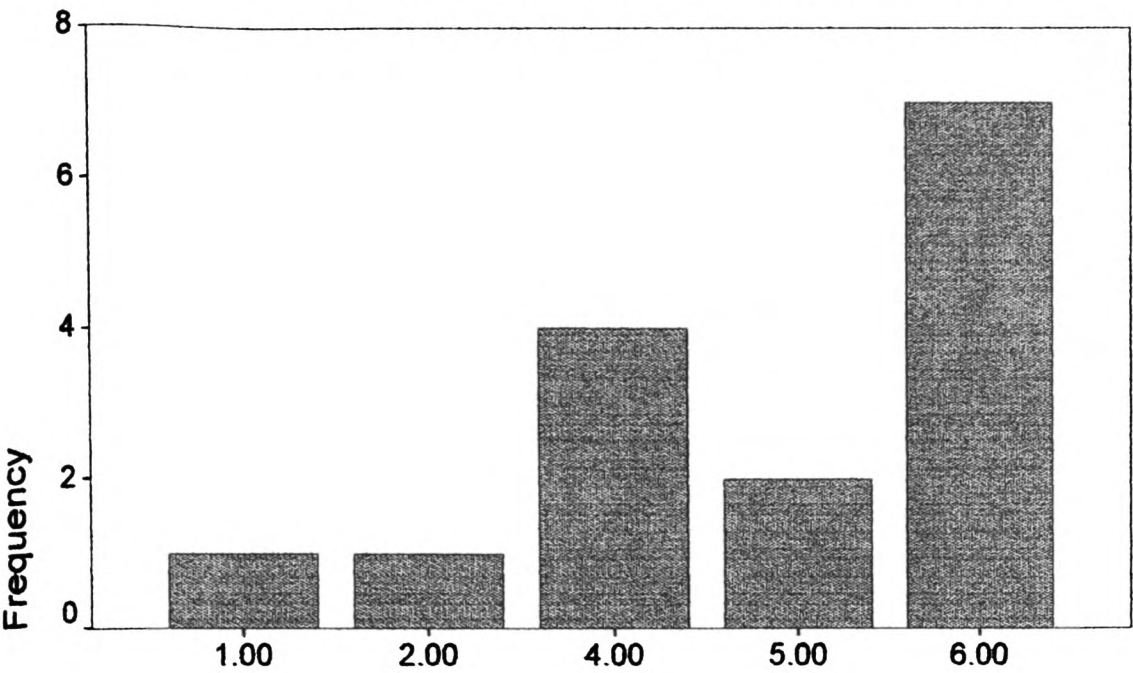
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q48

q49

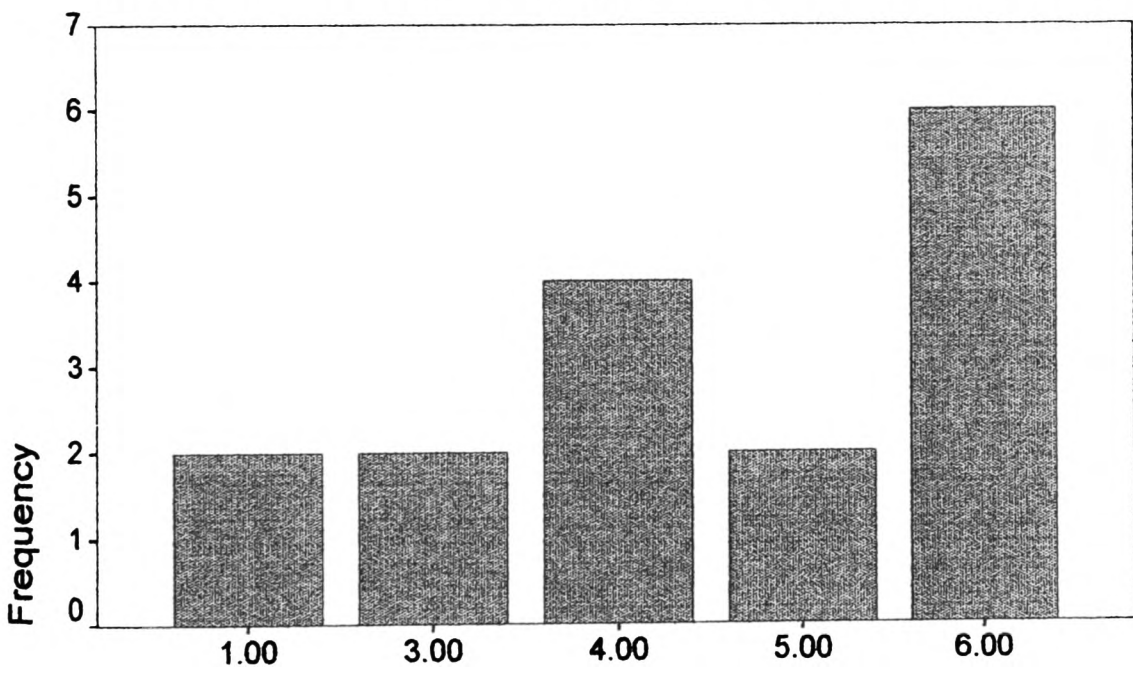
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q49

q50

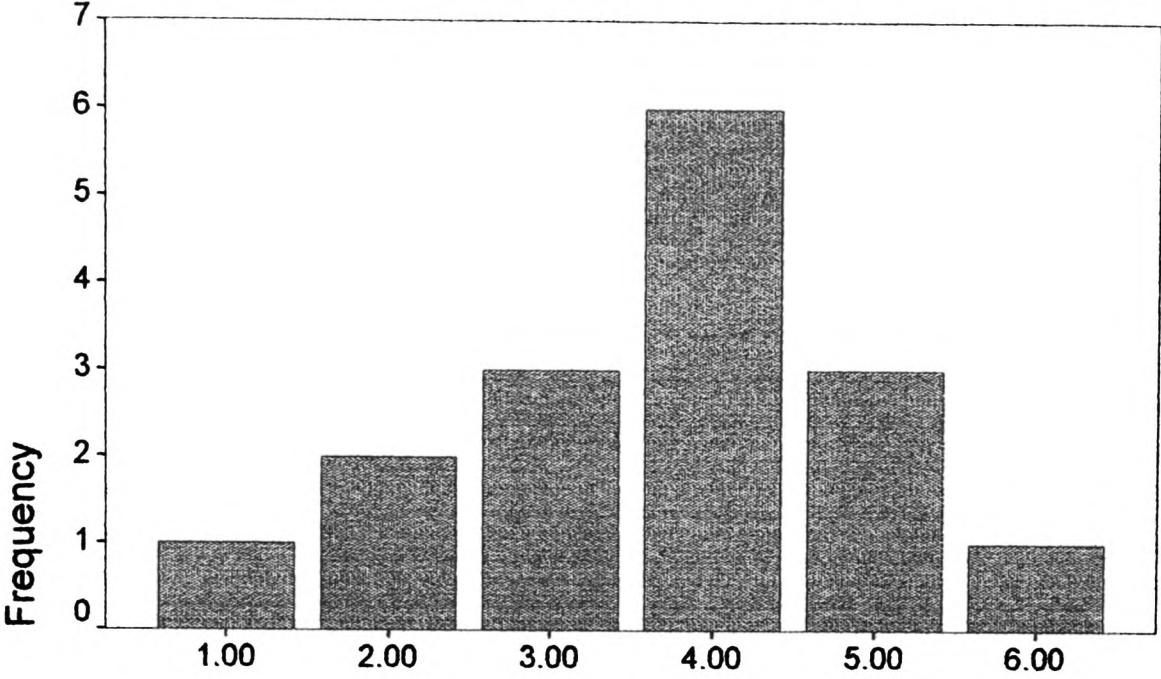
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q50

q51

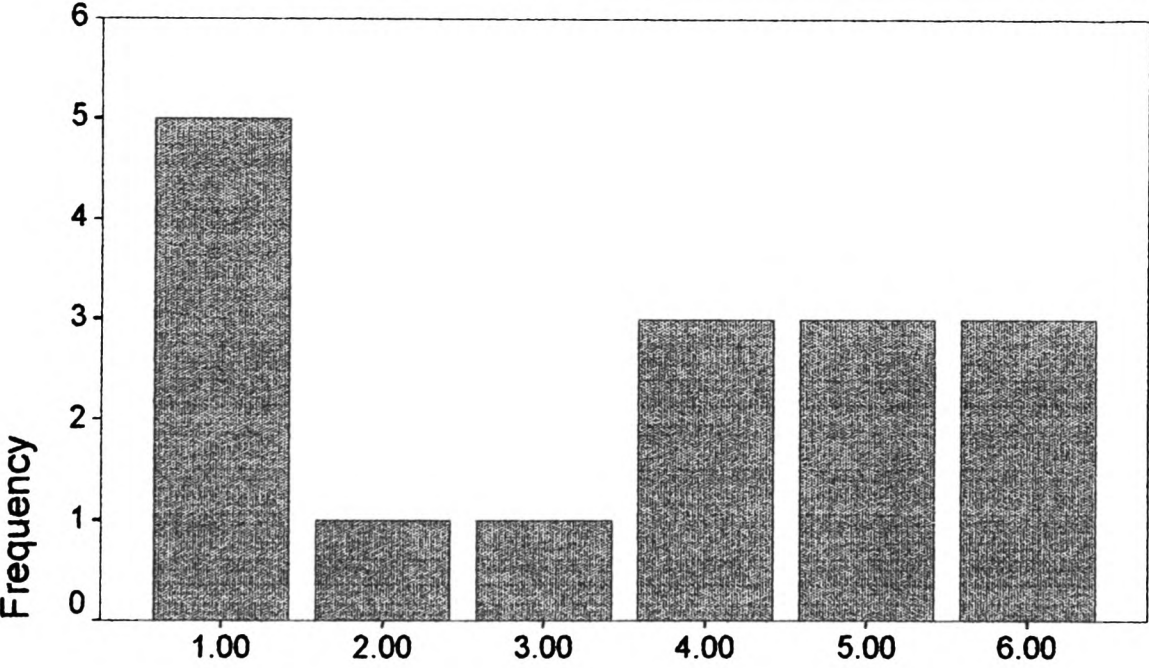
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q51

q52

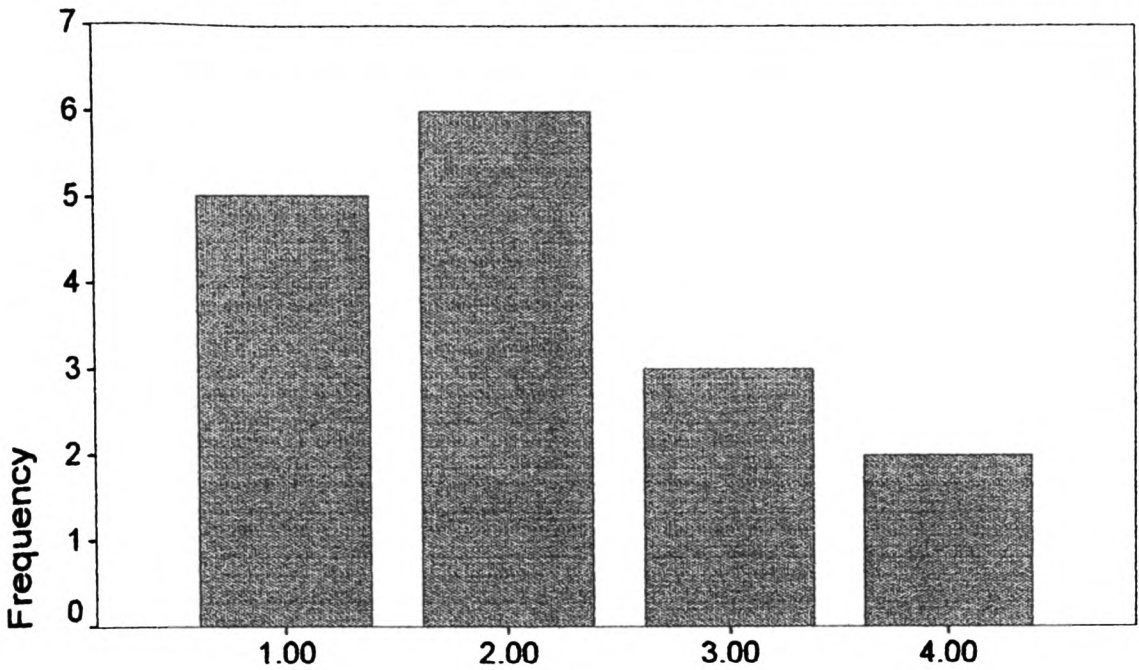
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q52

q53

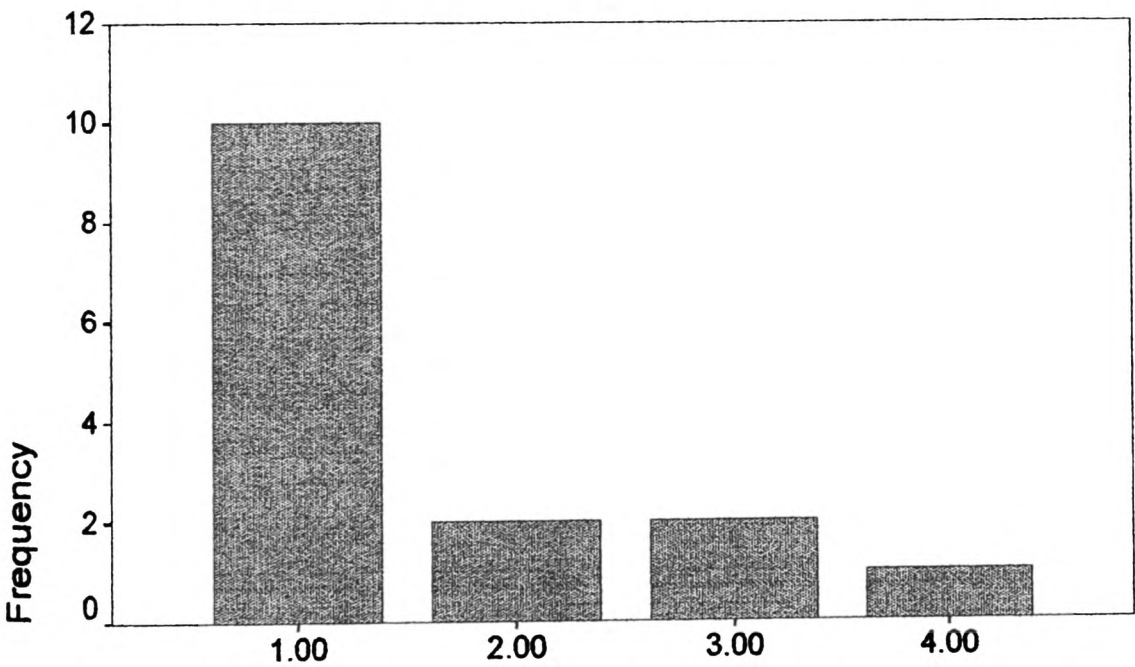
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q53

q54

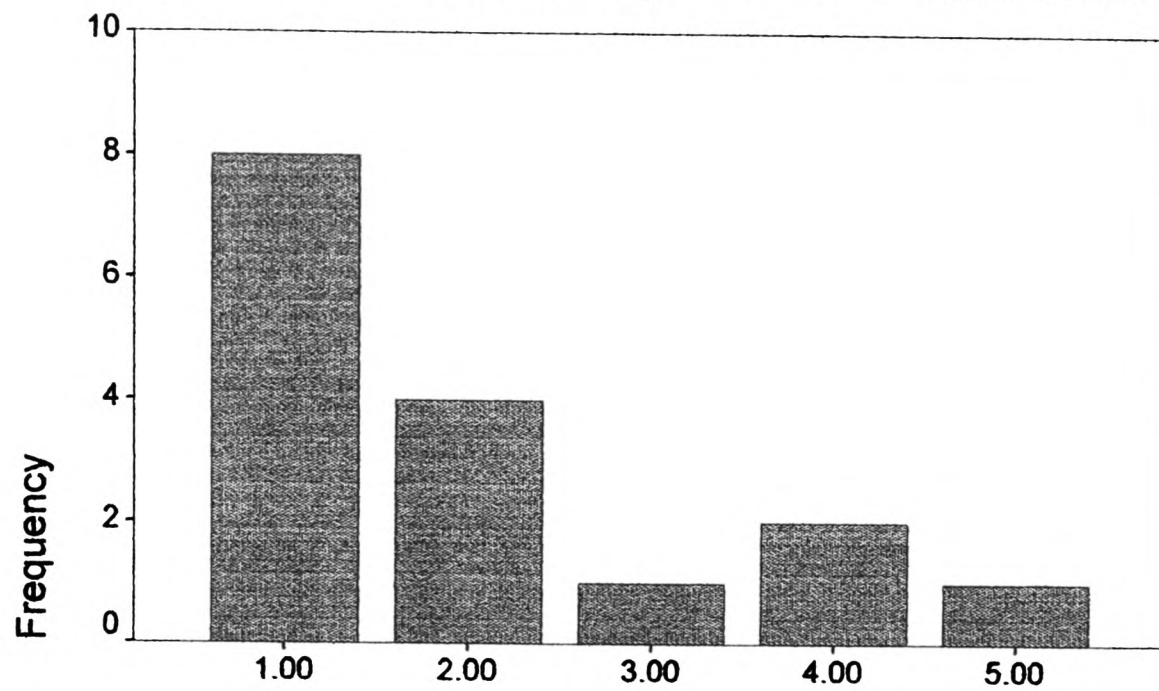
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q54

q55

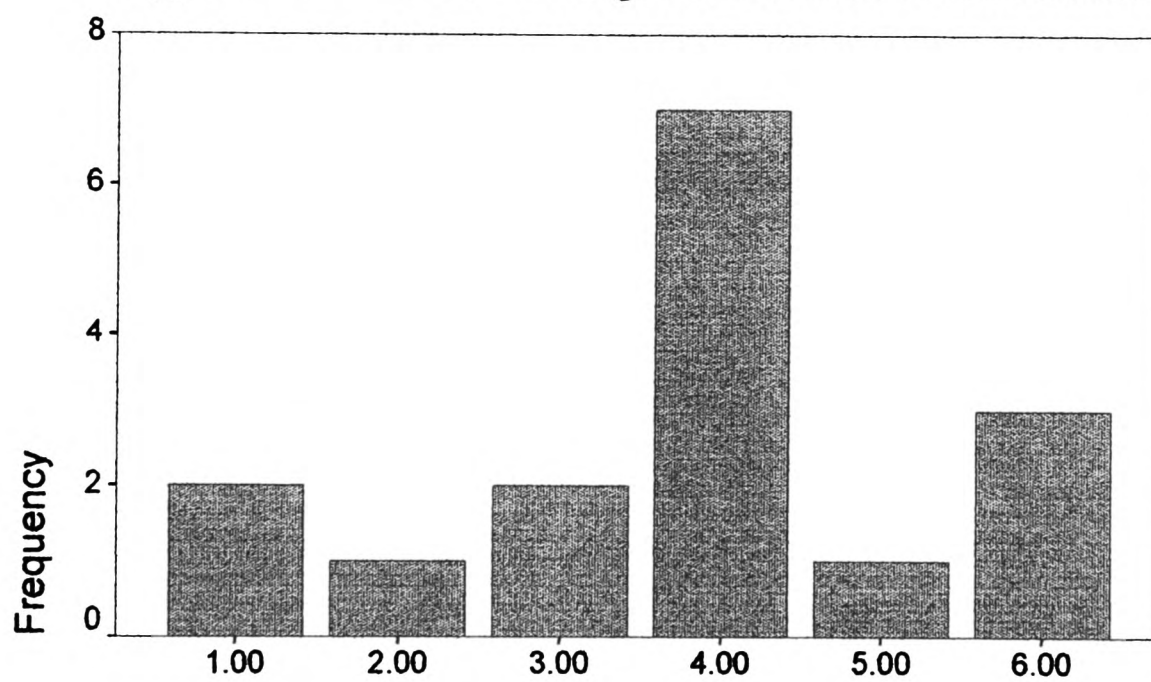
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q55

q56

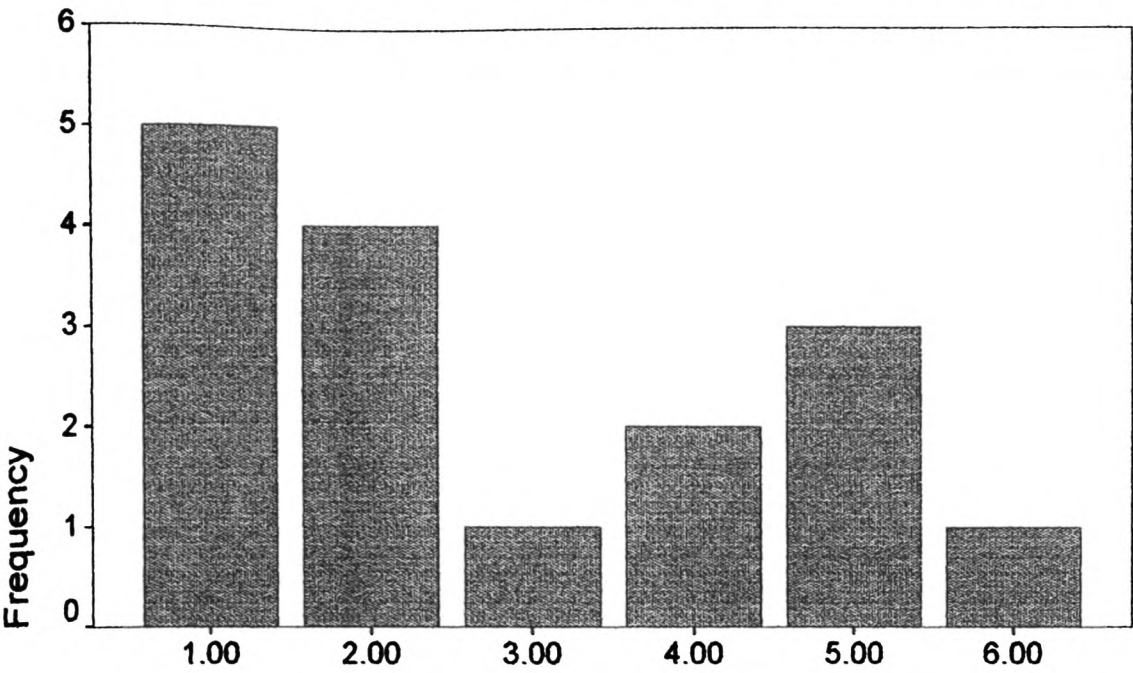
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q56

q57

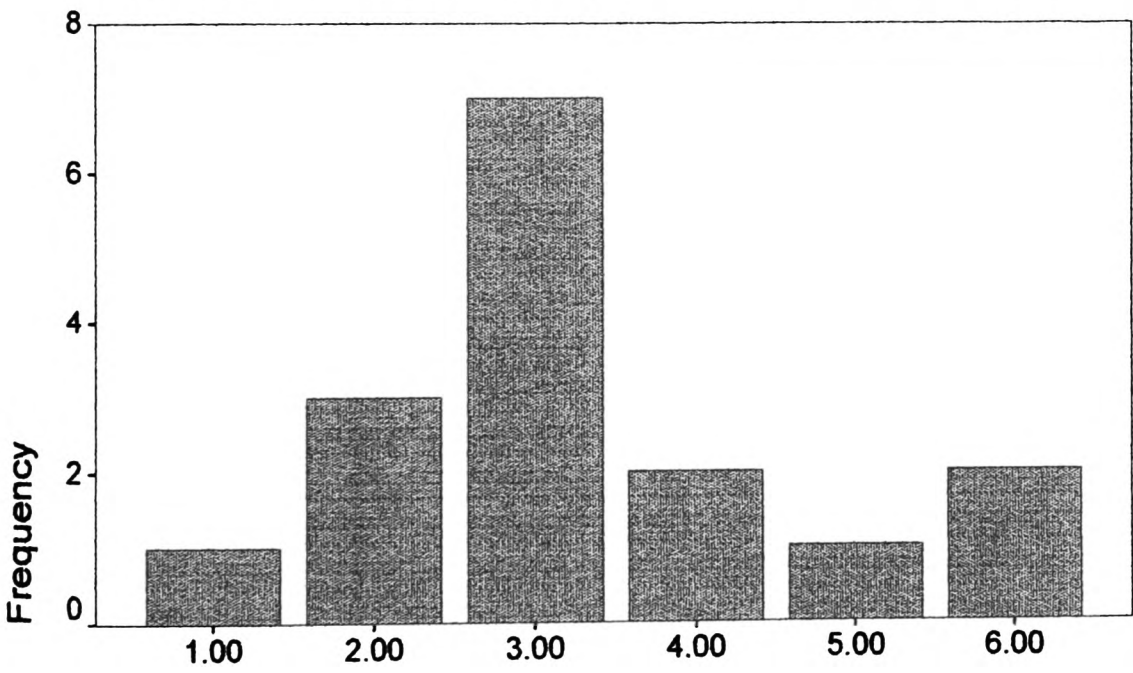
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q57

q58

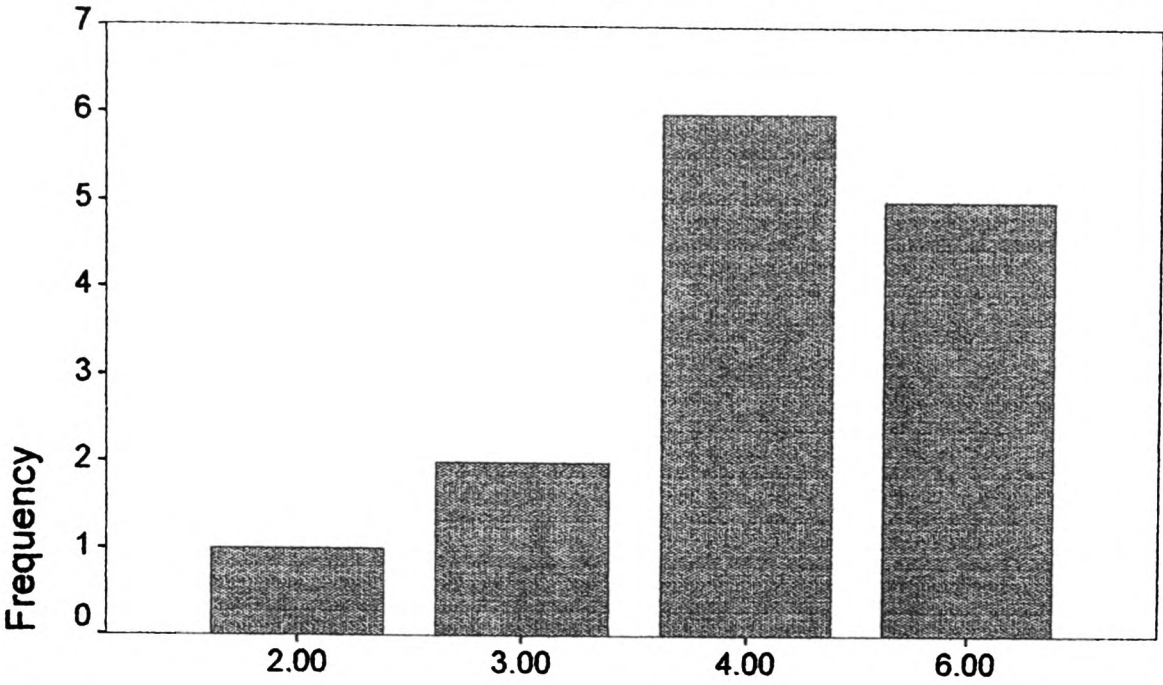
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q58

q59

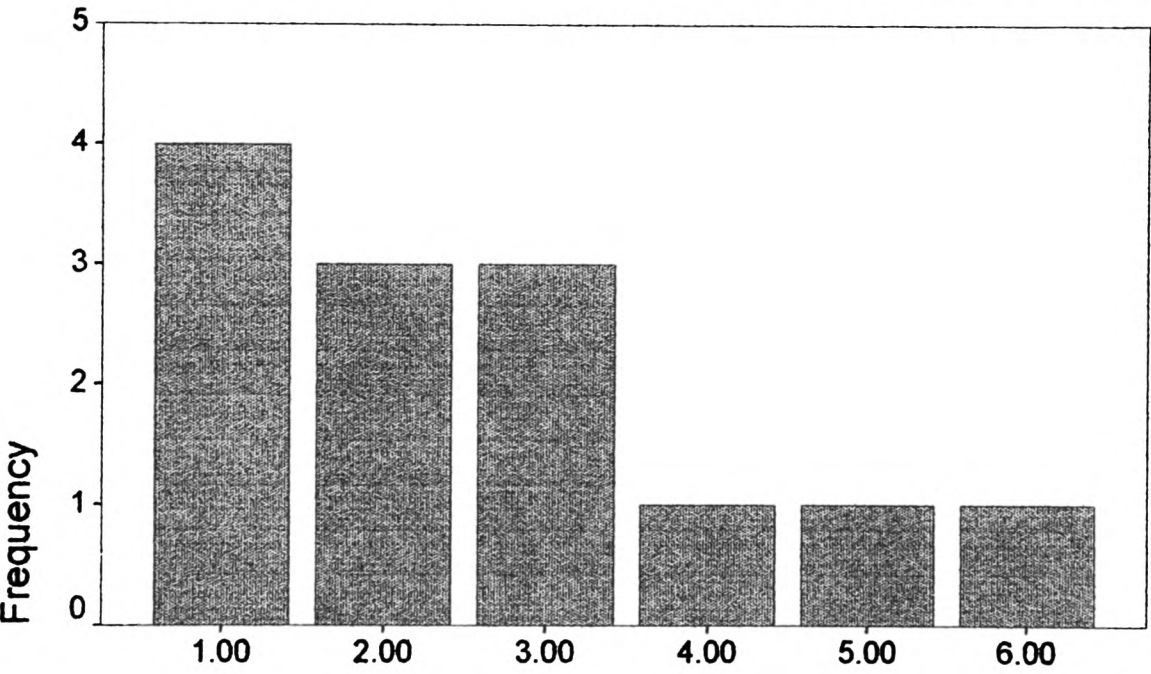
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q59

q60

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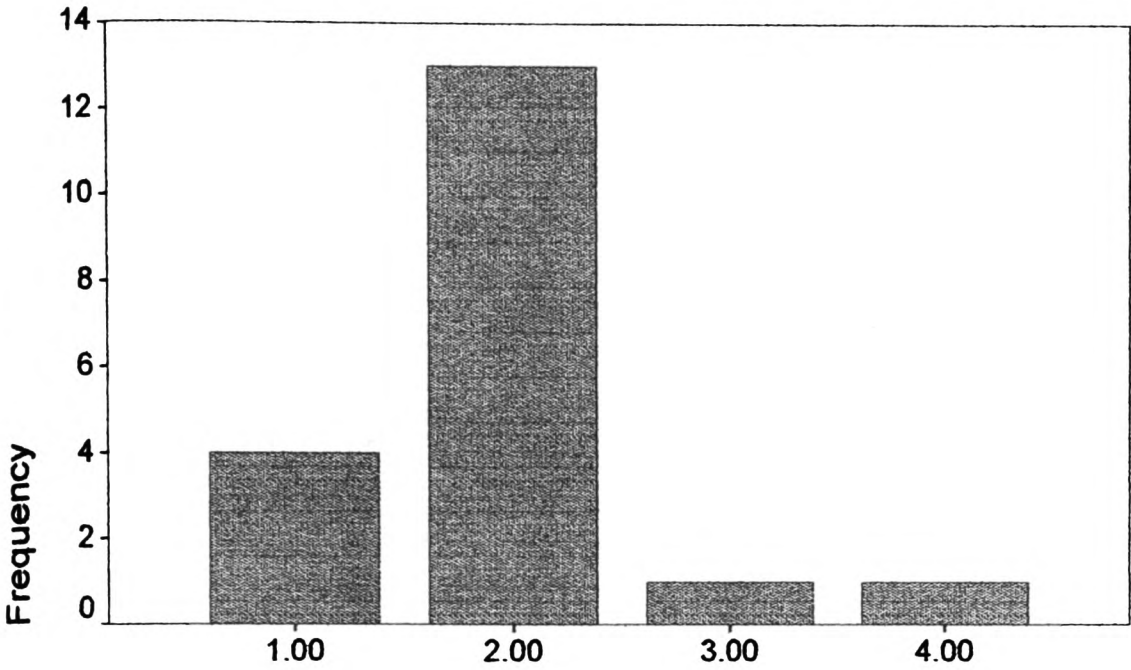


q60

Bar Chart

q1

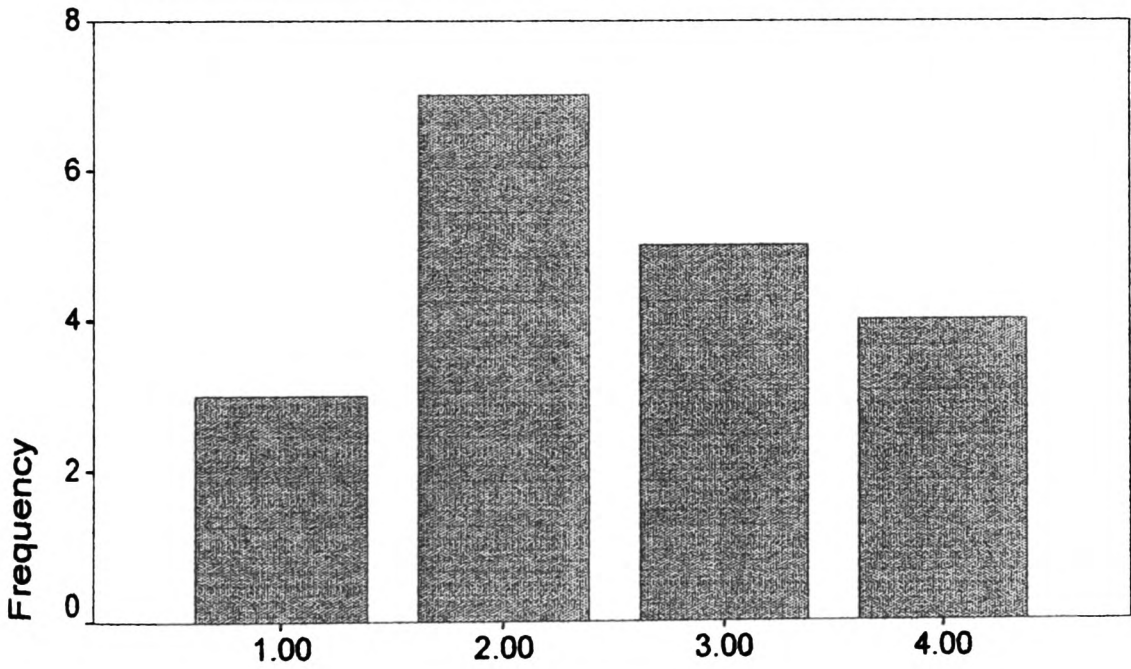
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q1

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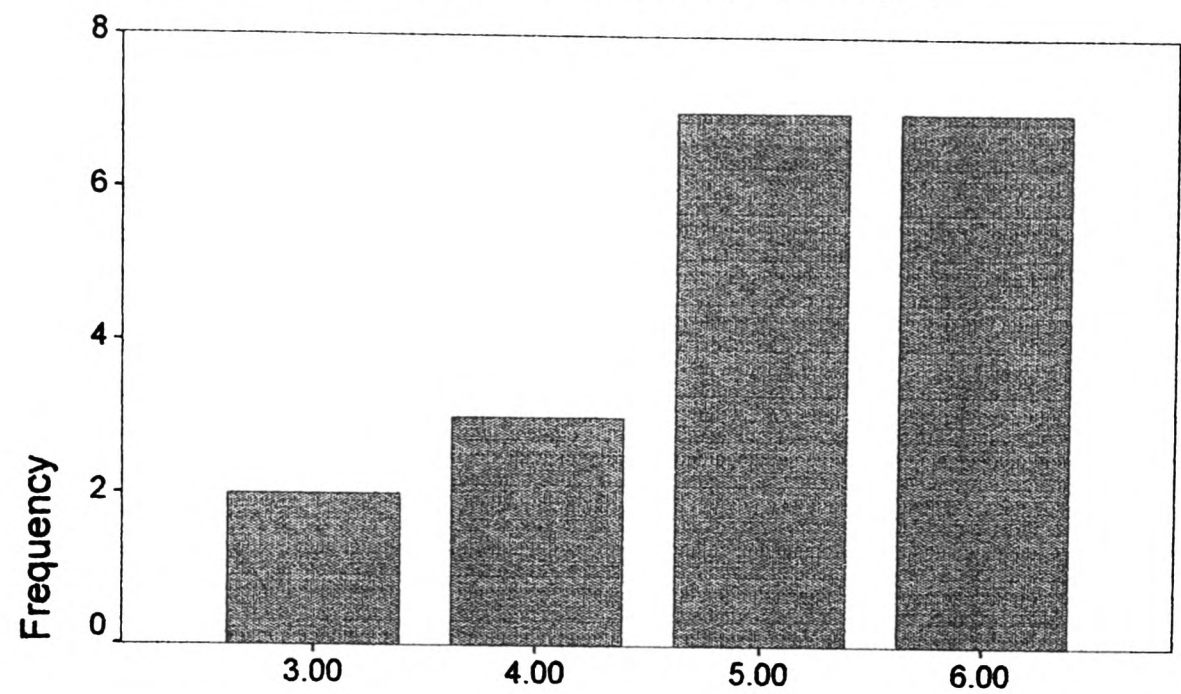
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q2

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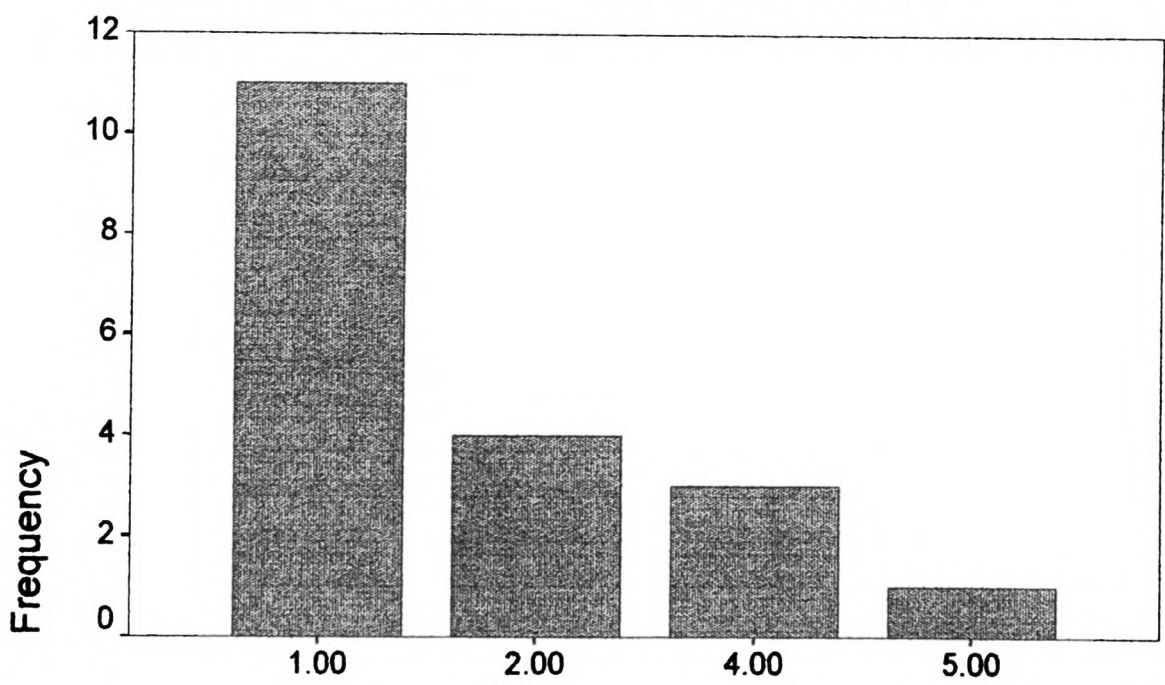
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q3

q4

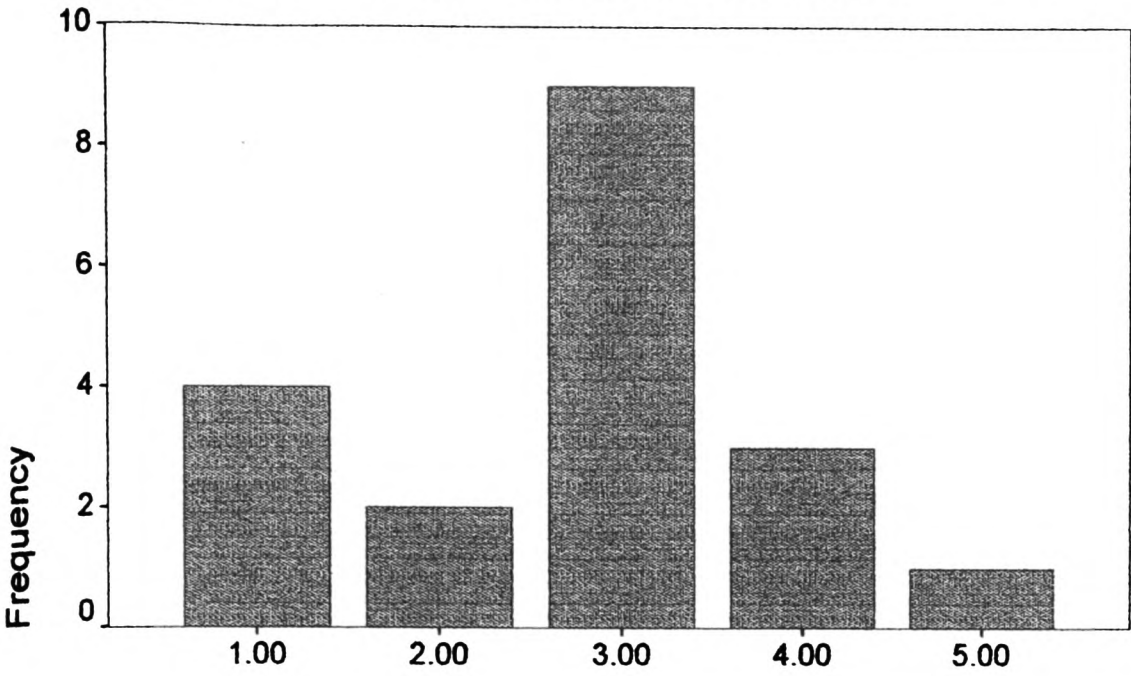
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q4

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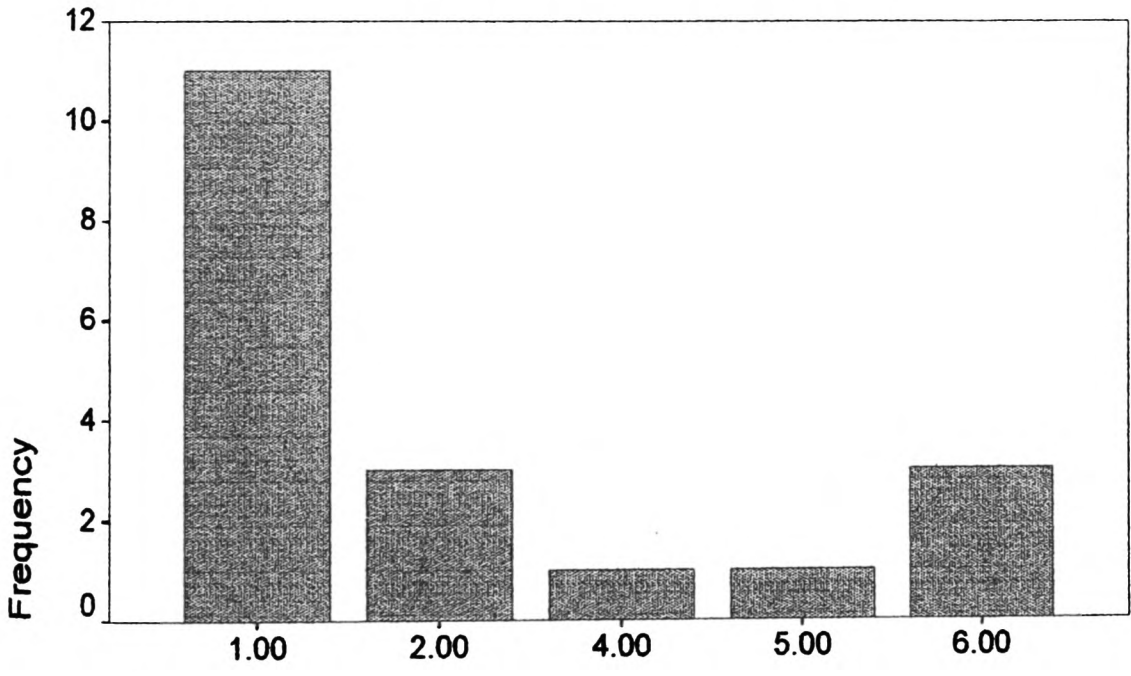
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q5

q6

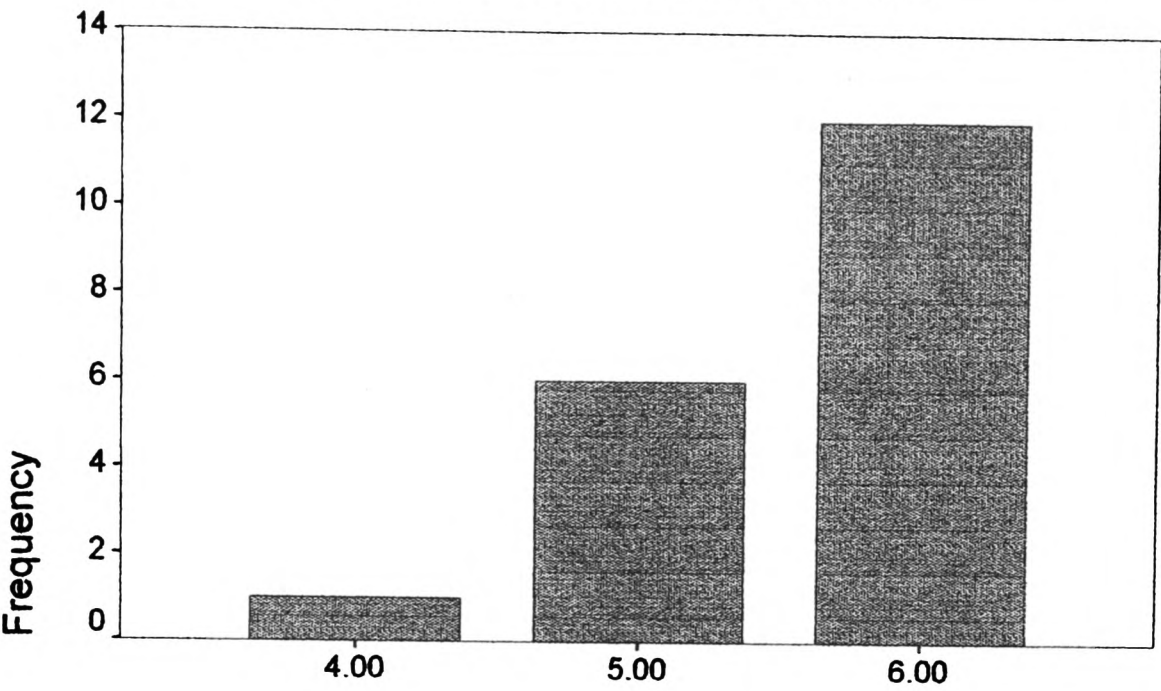
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q6

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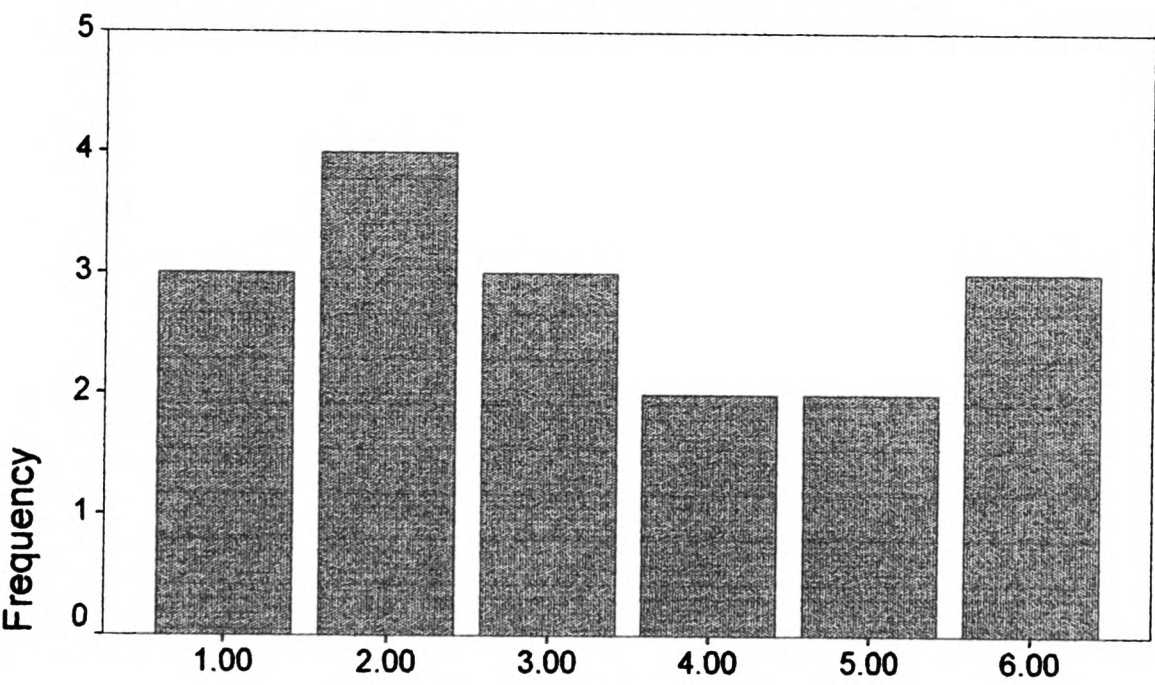
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q7

q8

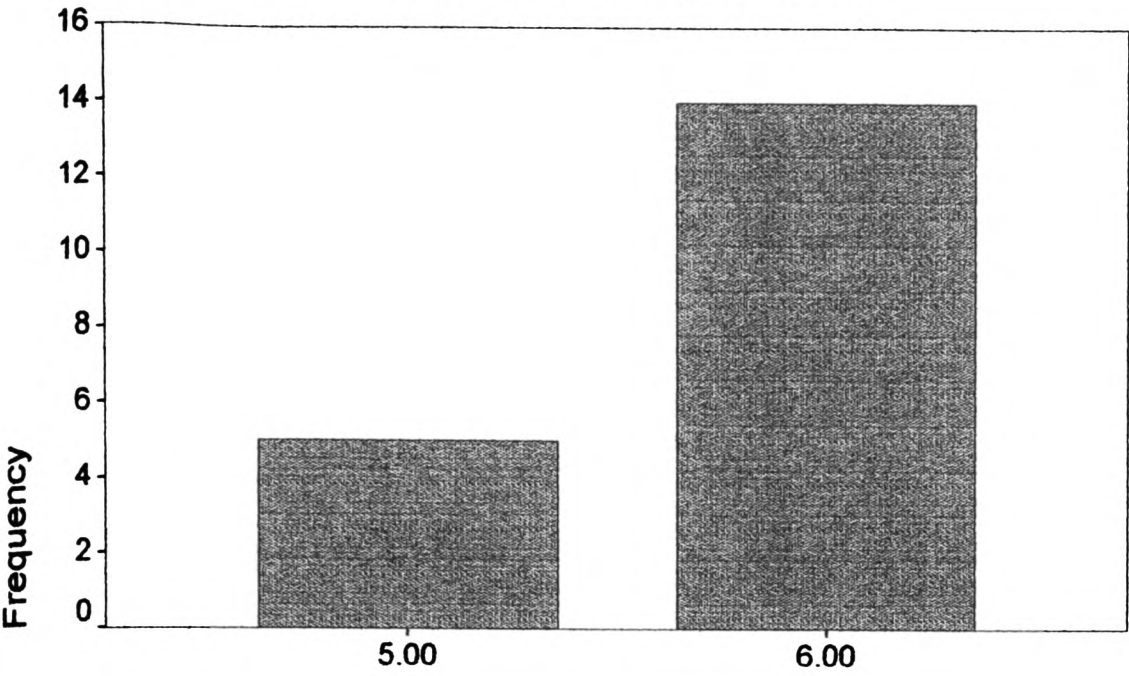
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q8

q9

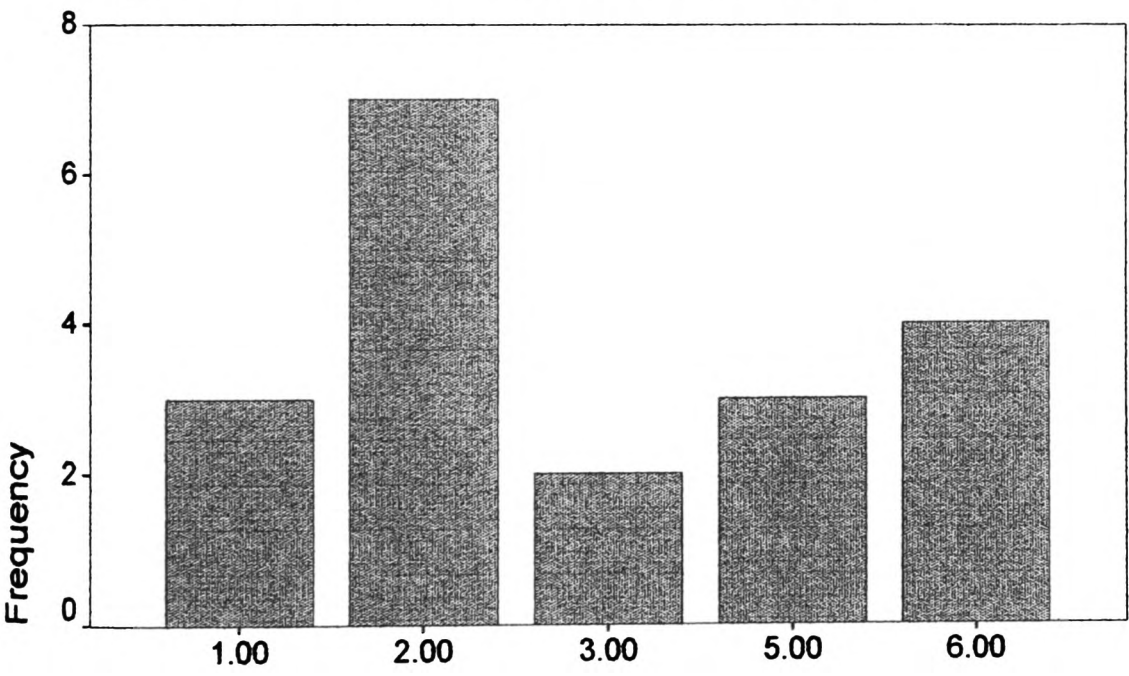
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q9

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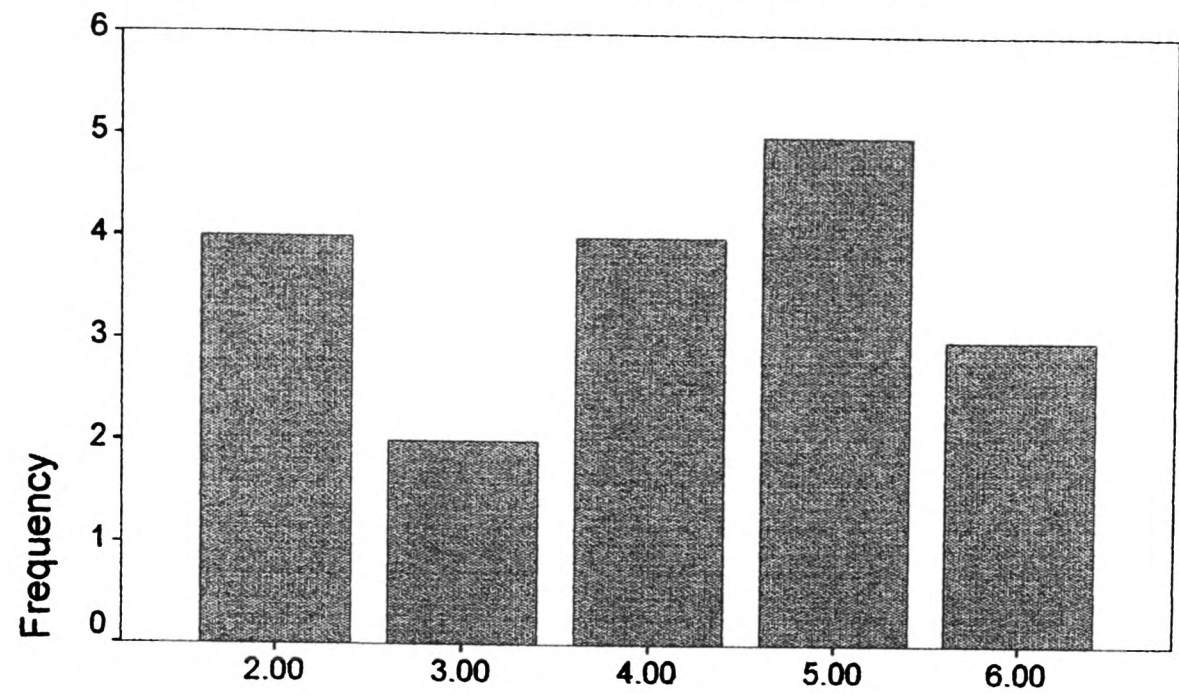
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q10

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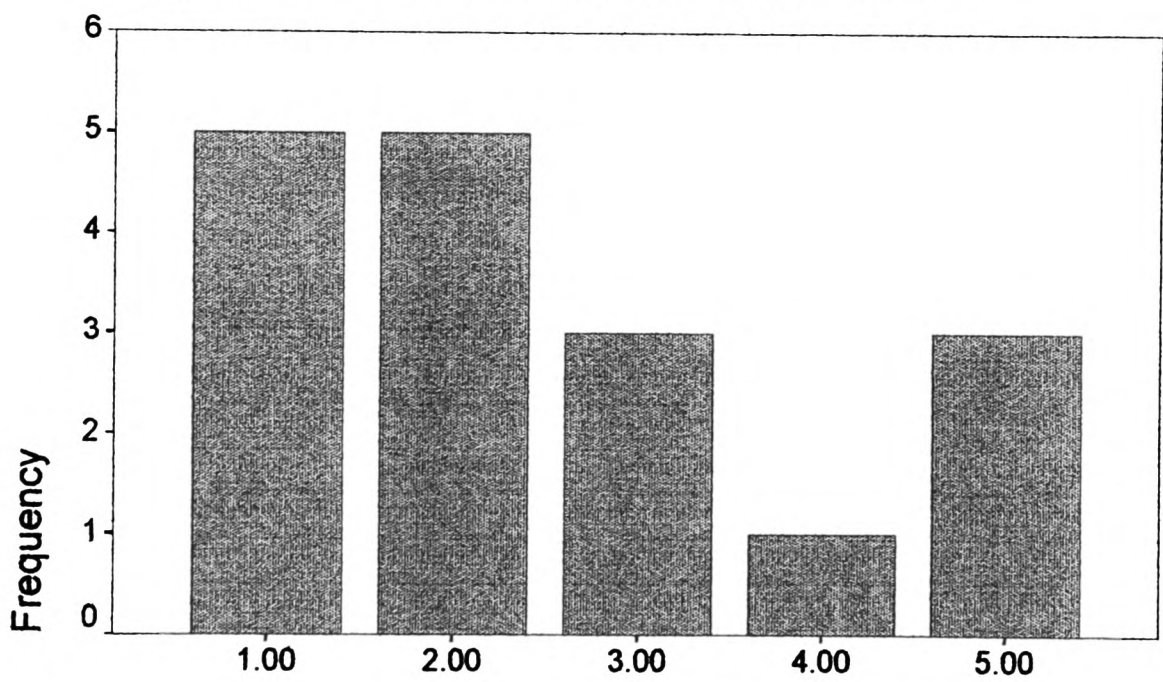
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q11

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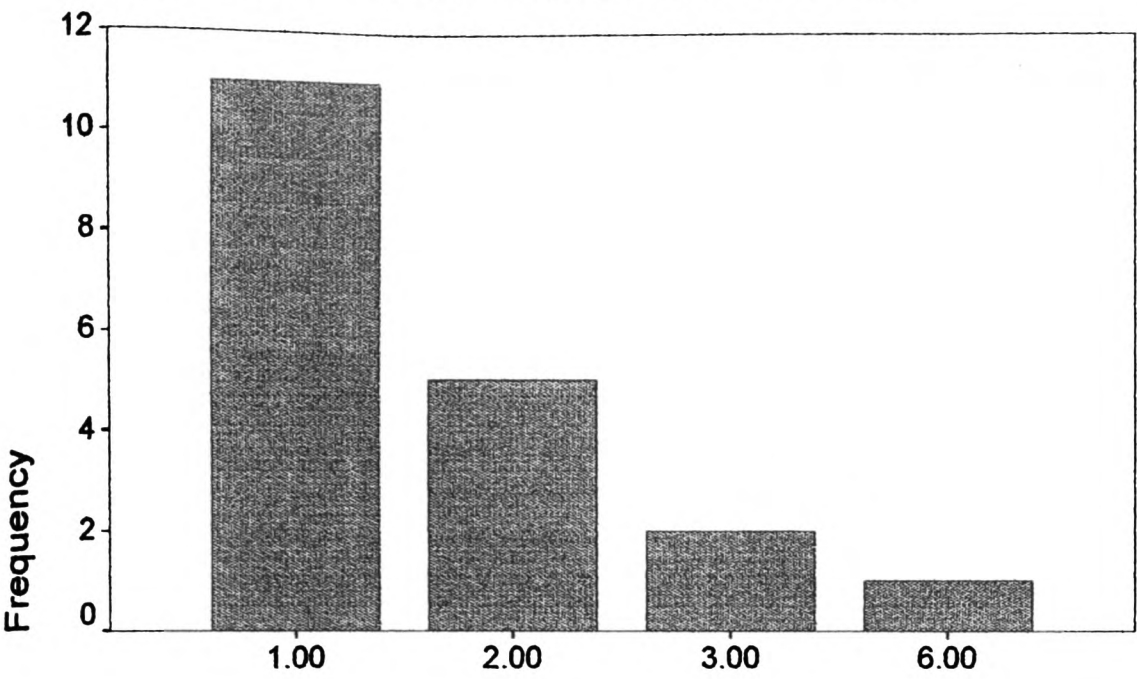
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q12

q13

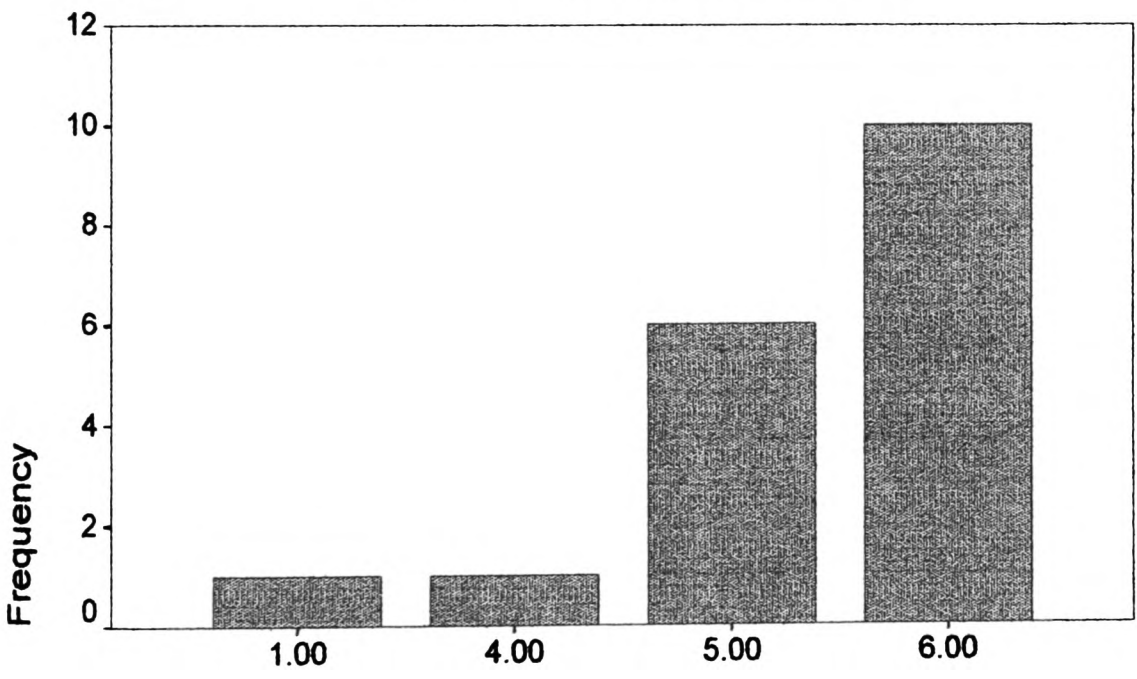
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q13

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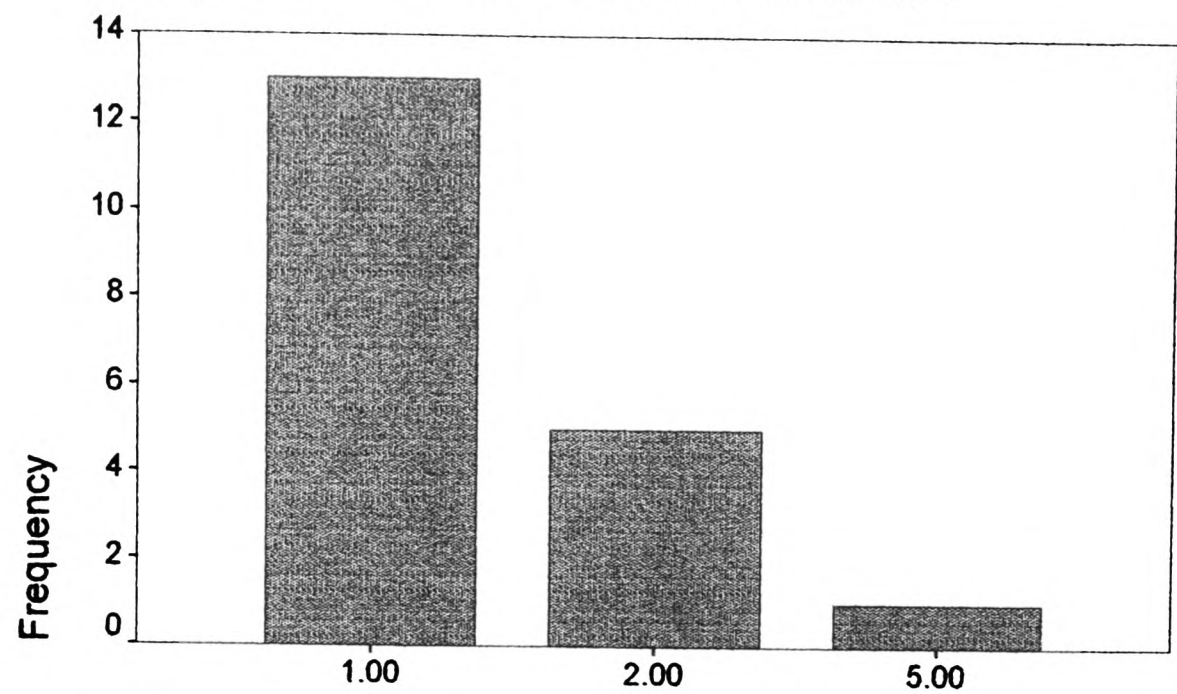
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q14

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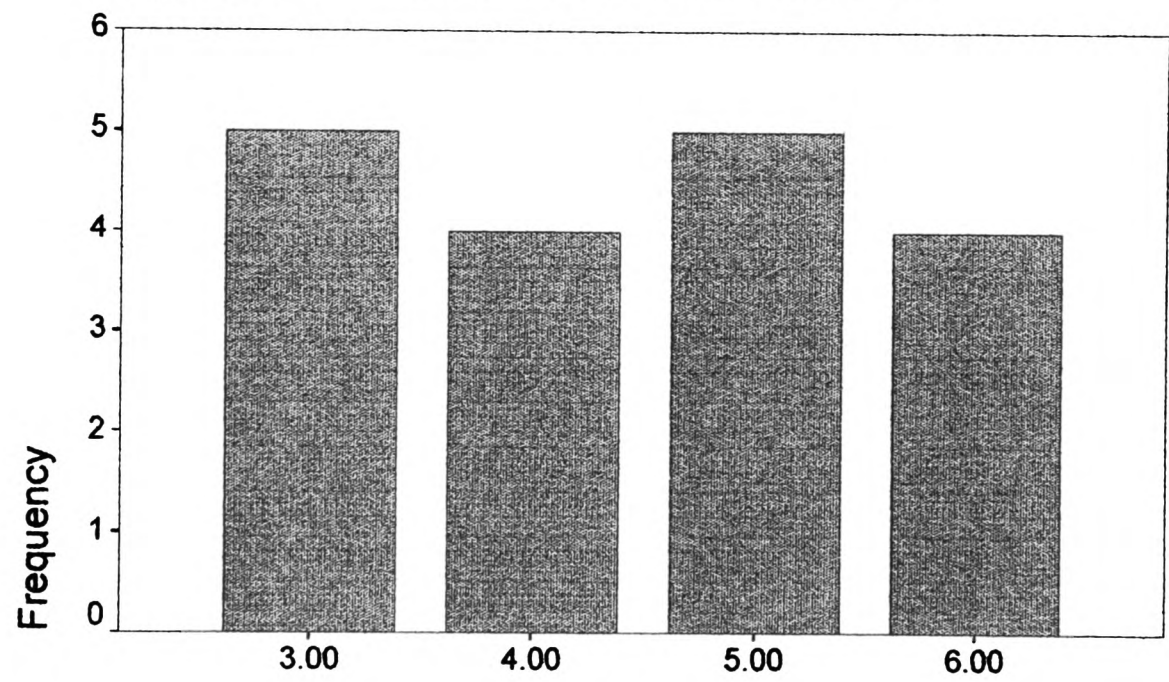
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q15

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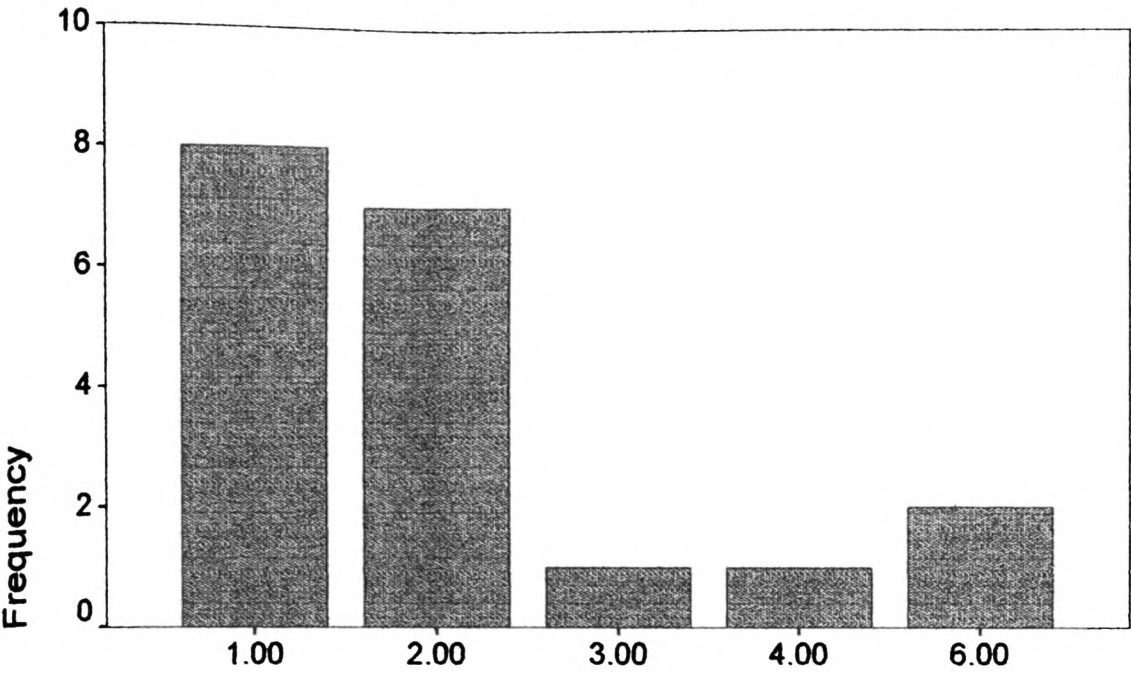
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q16

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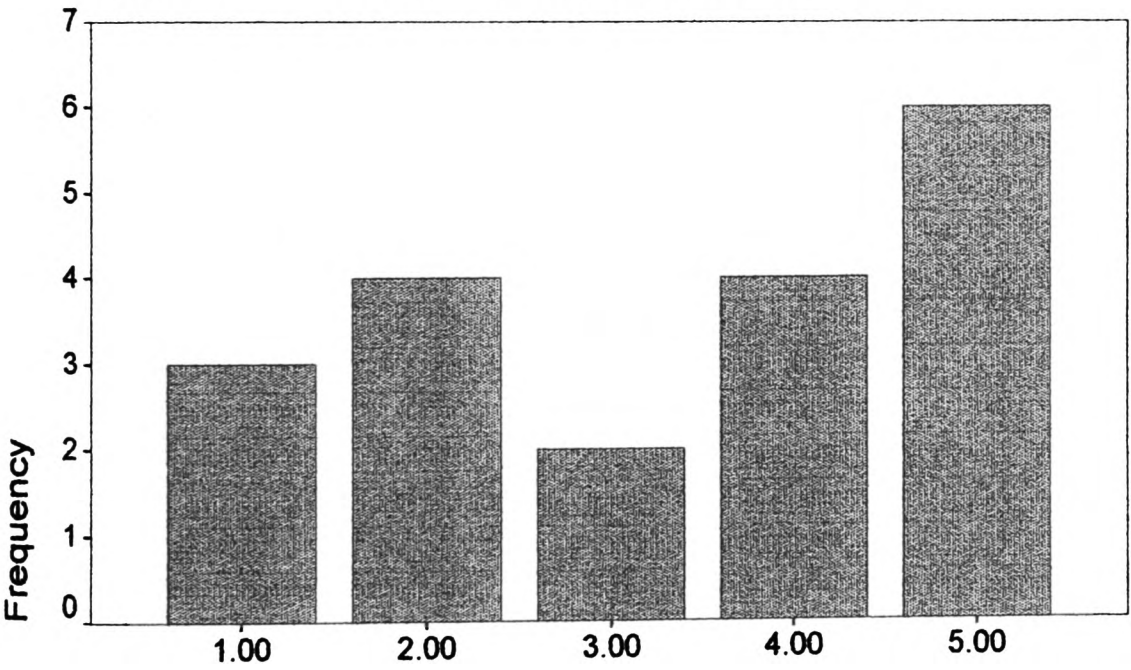
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q17

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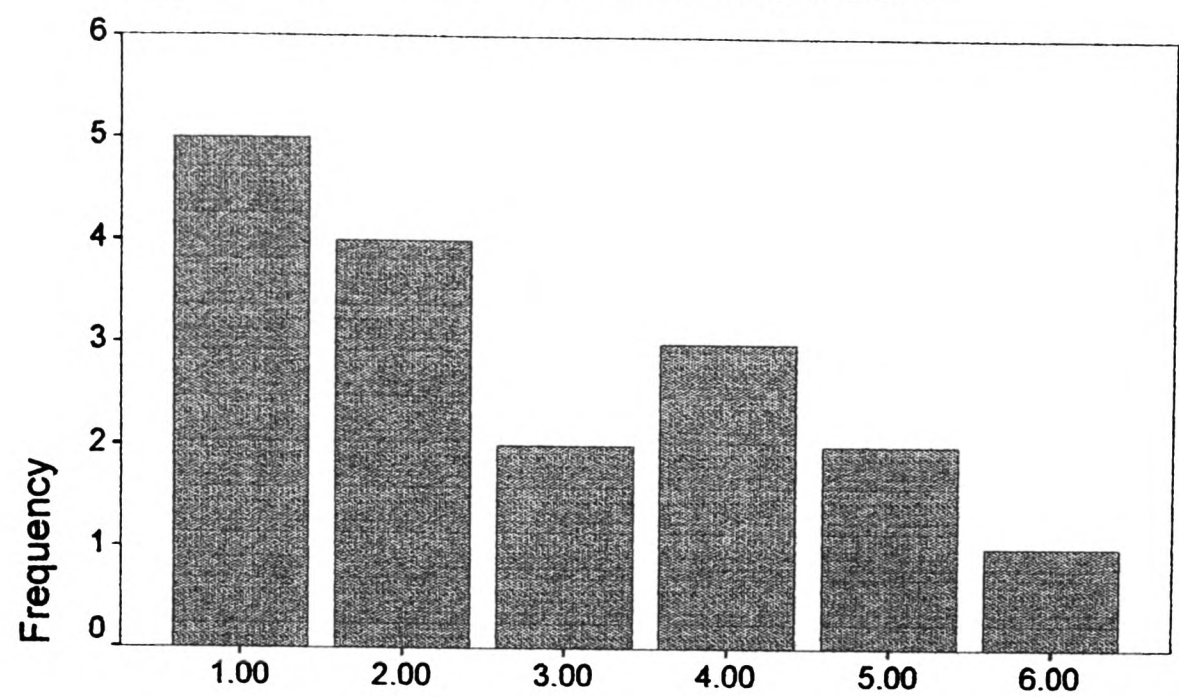
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q18

q19

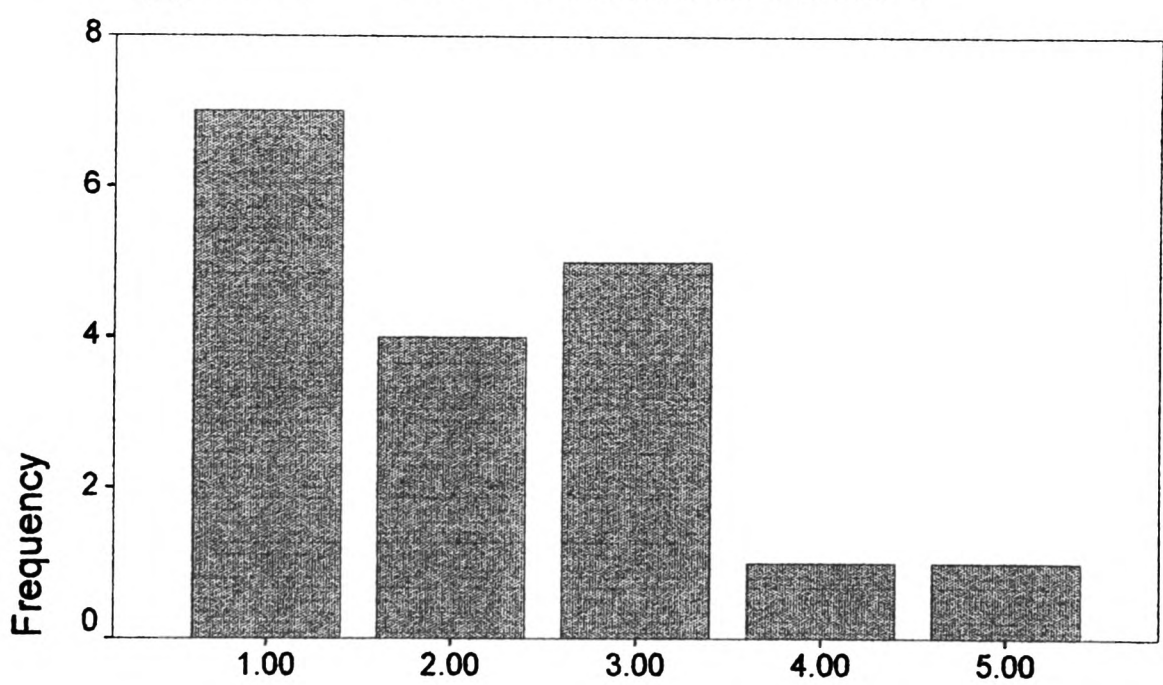
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q19

q20

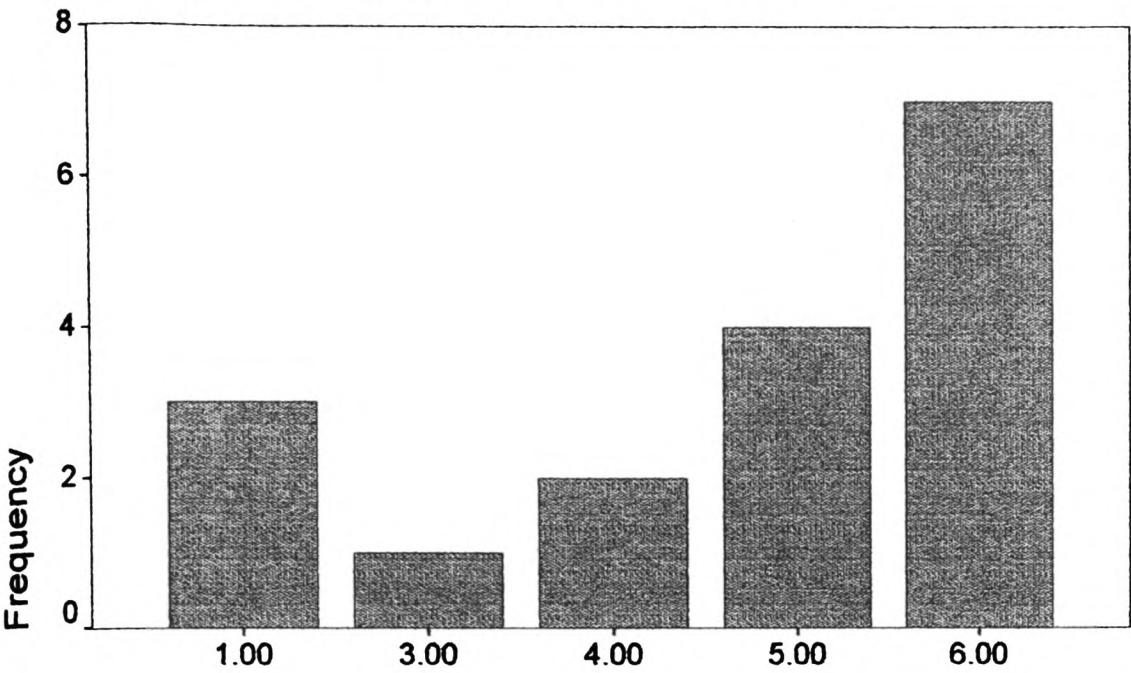
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q20

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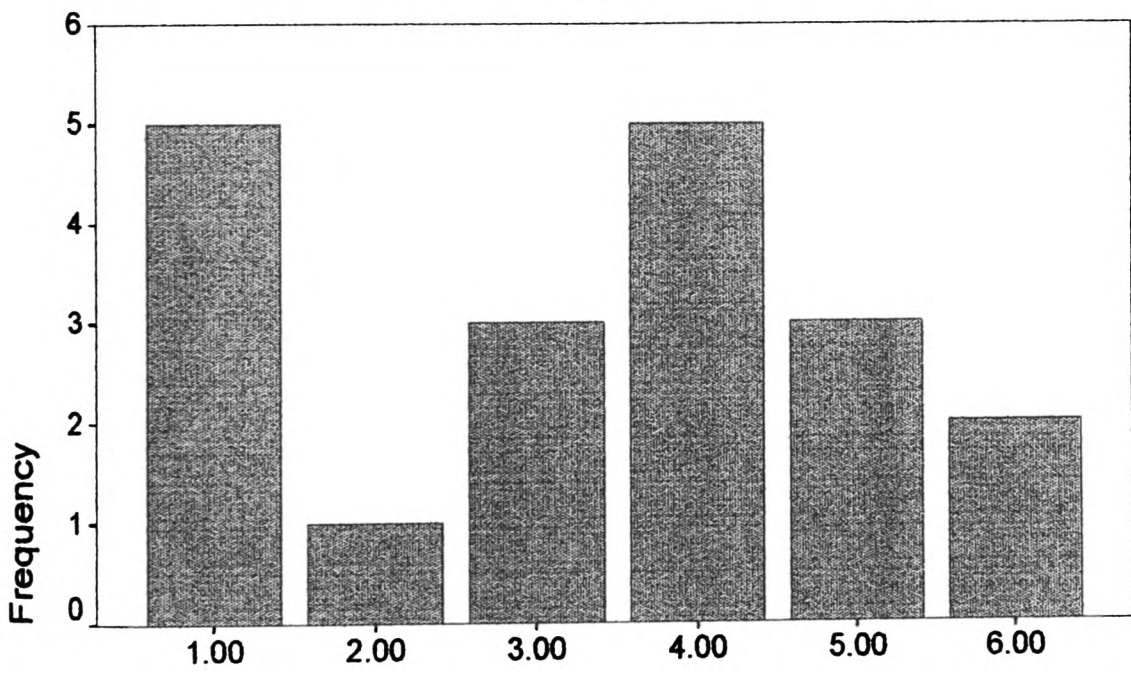
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q21

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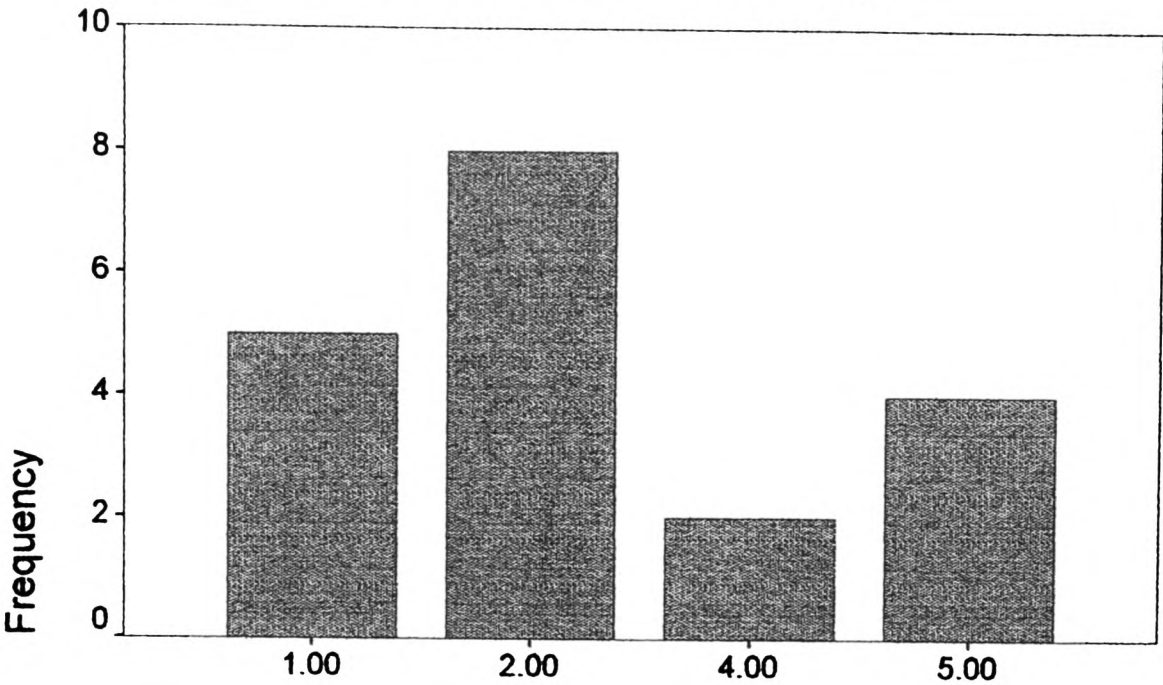
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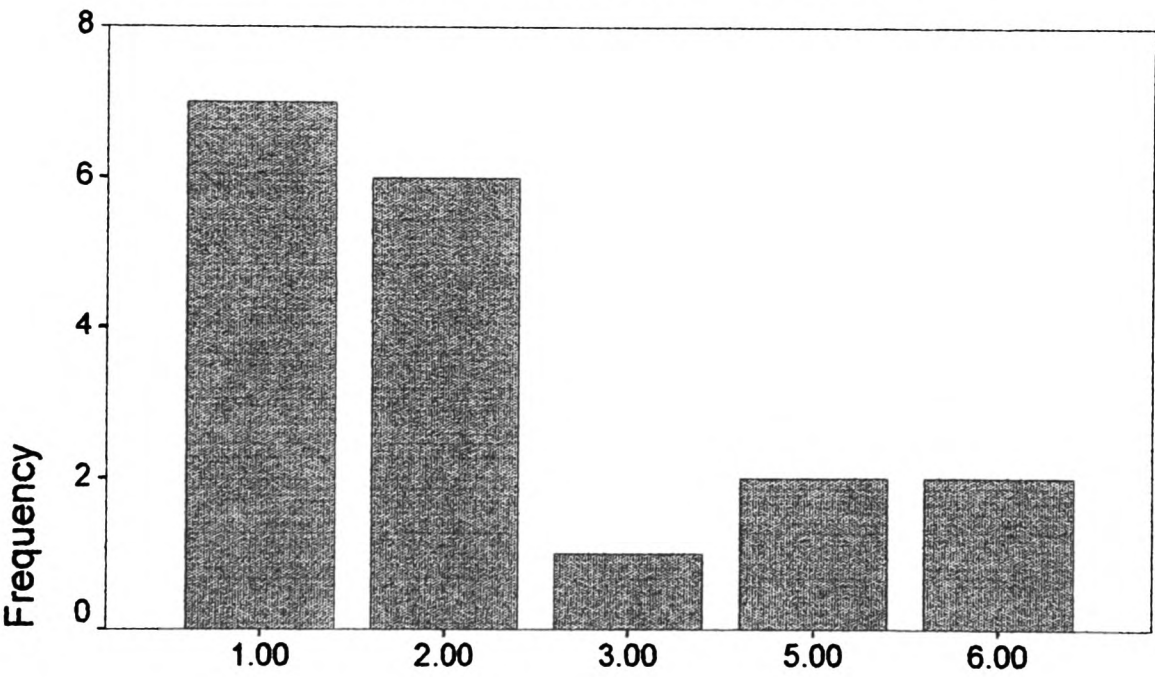
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q23

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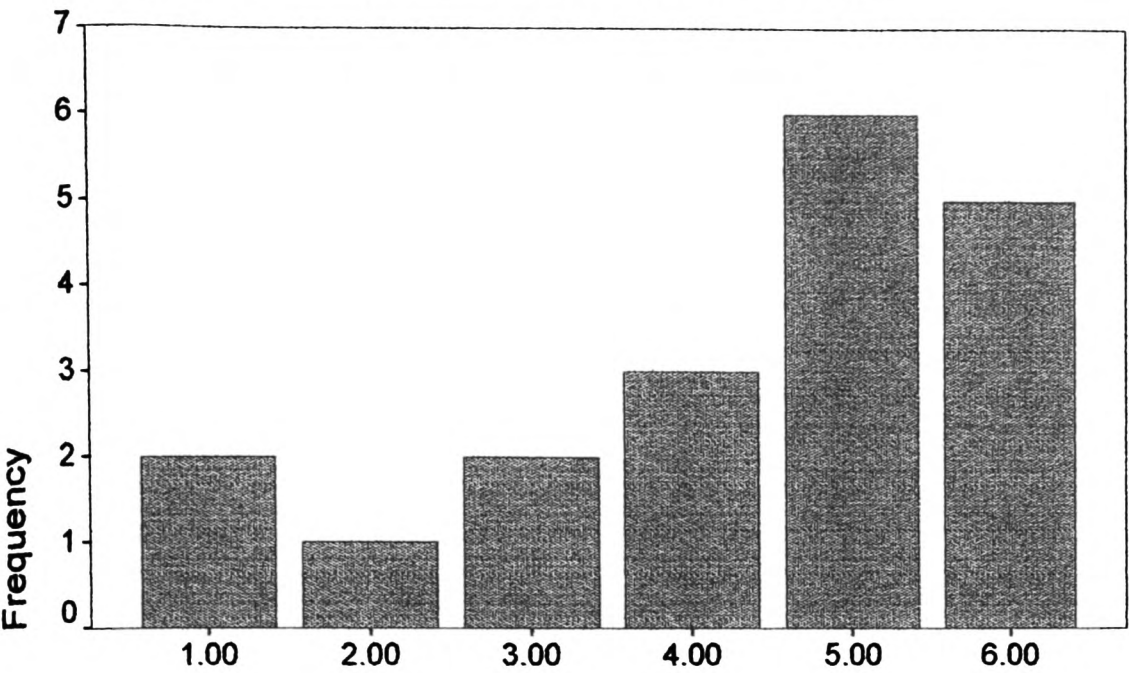
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q24

q25

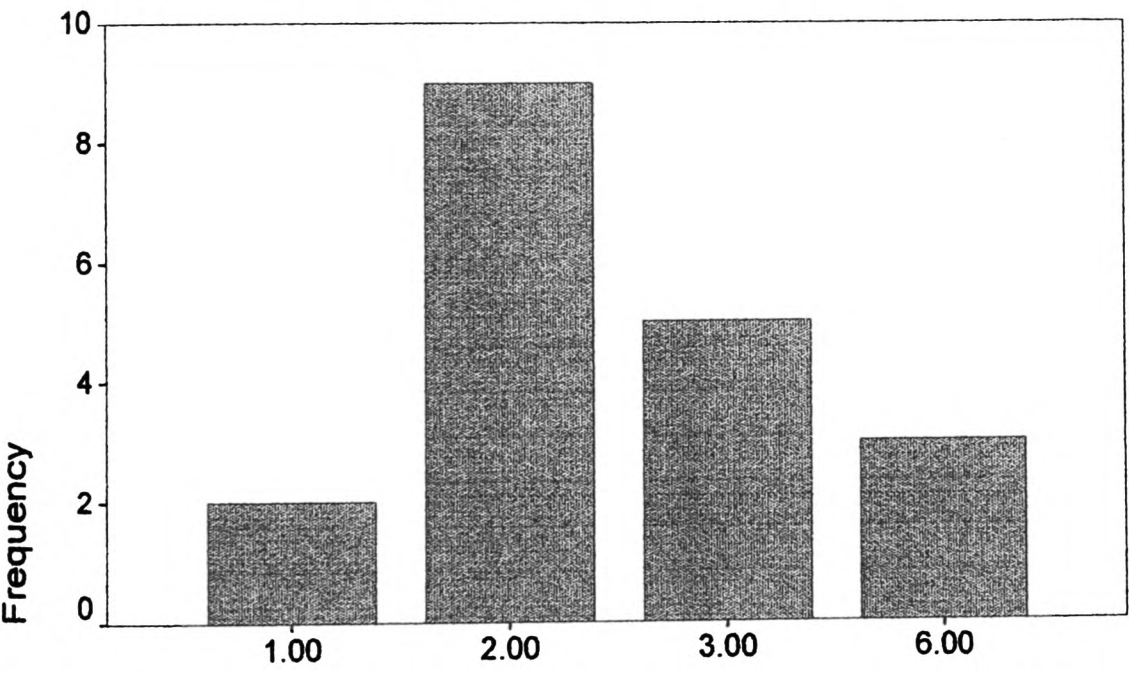
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q25

q26

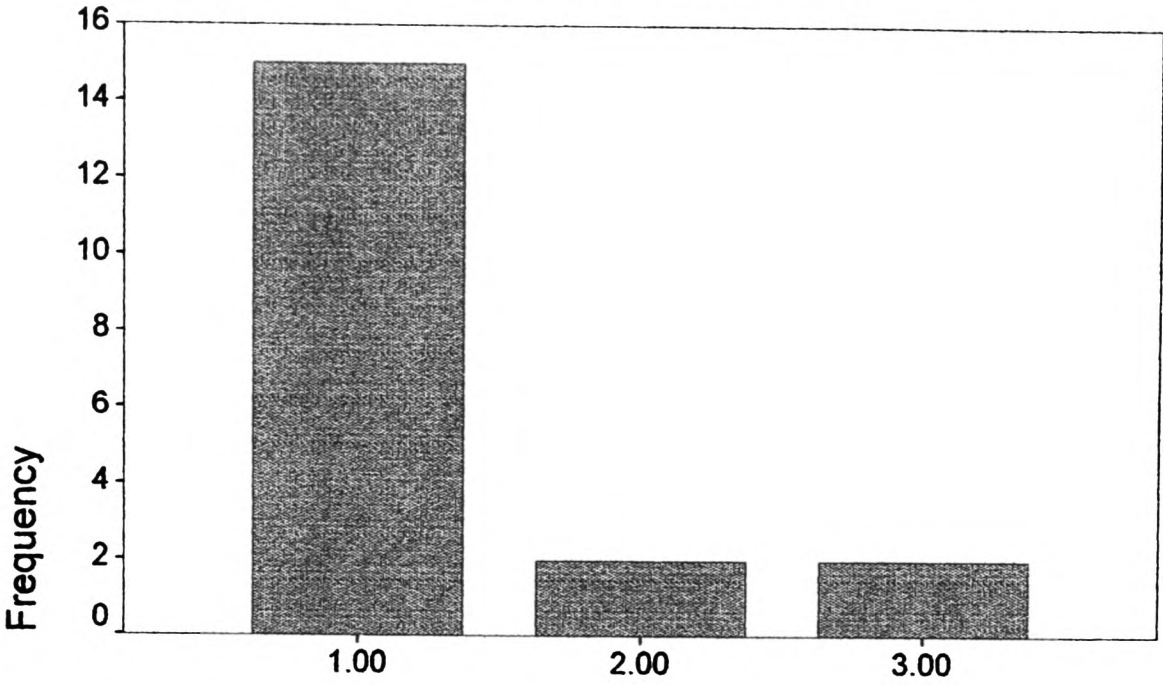
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q26

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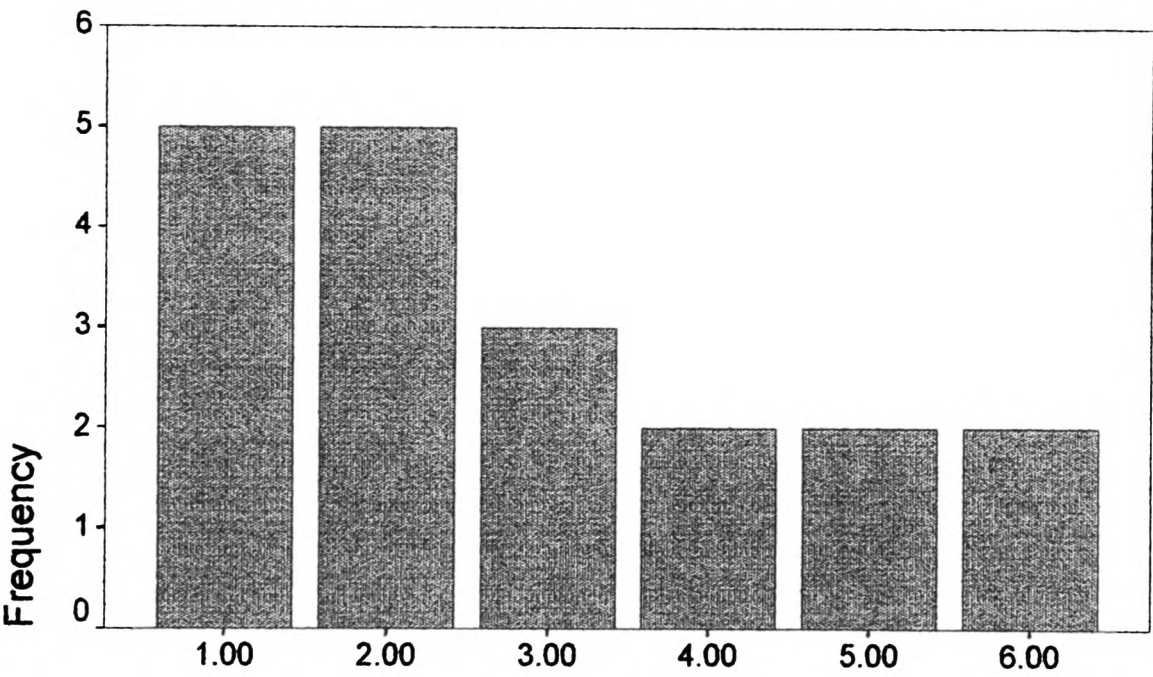
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q27

q28

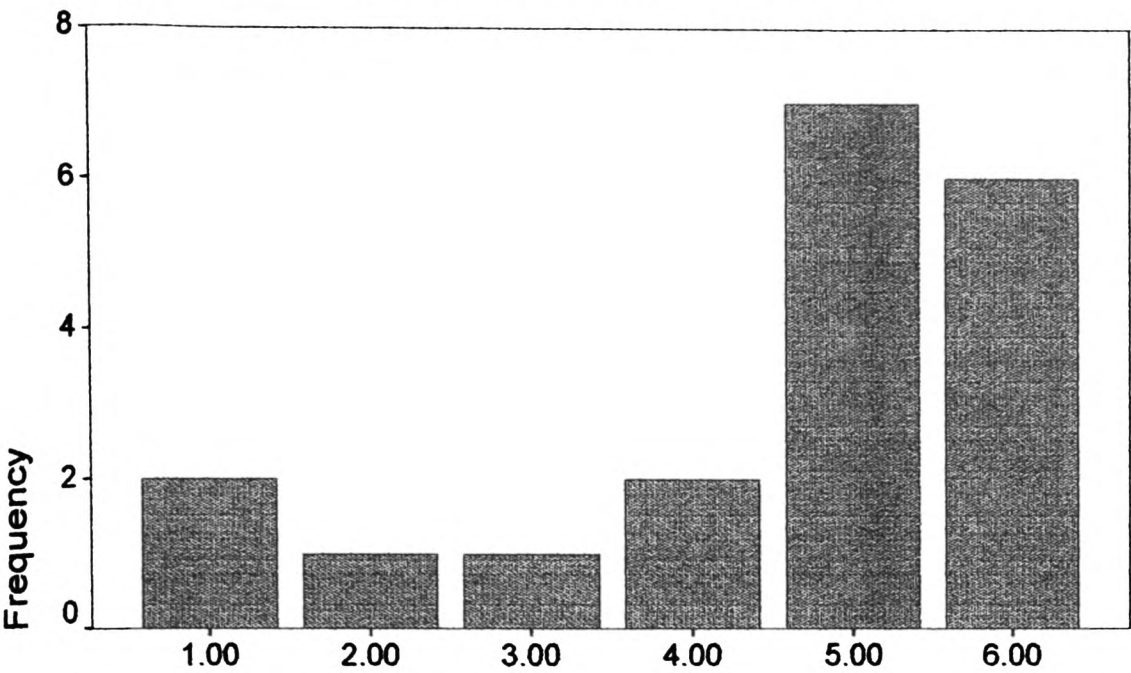
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q28

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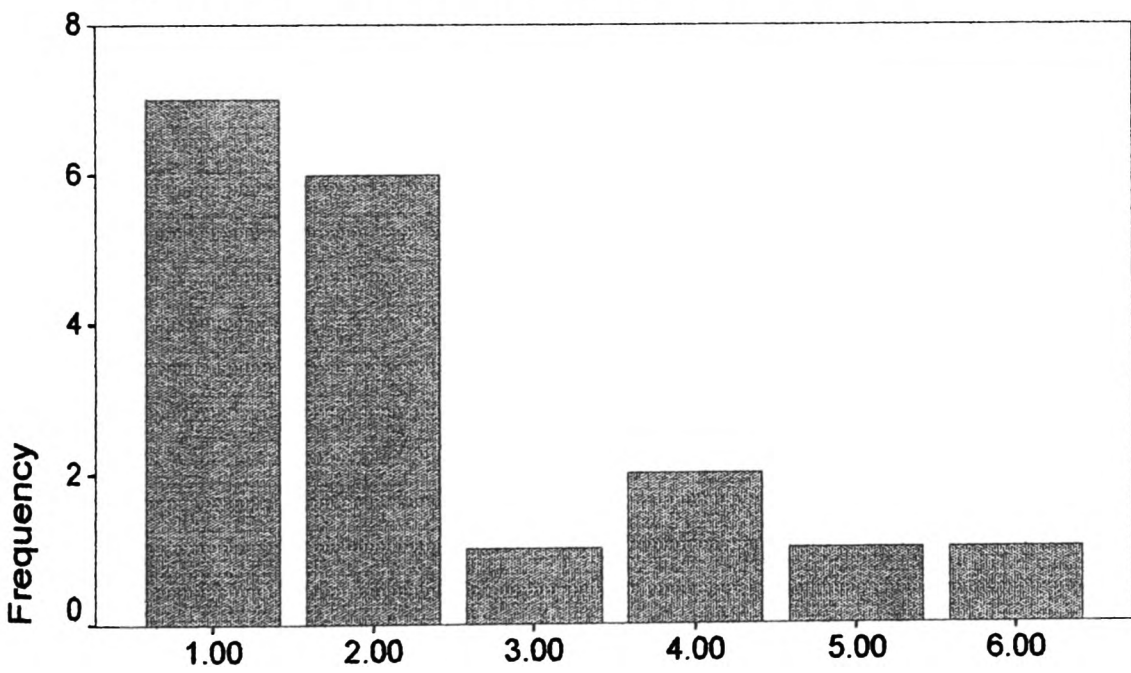
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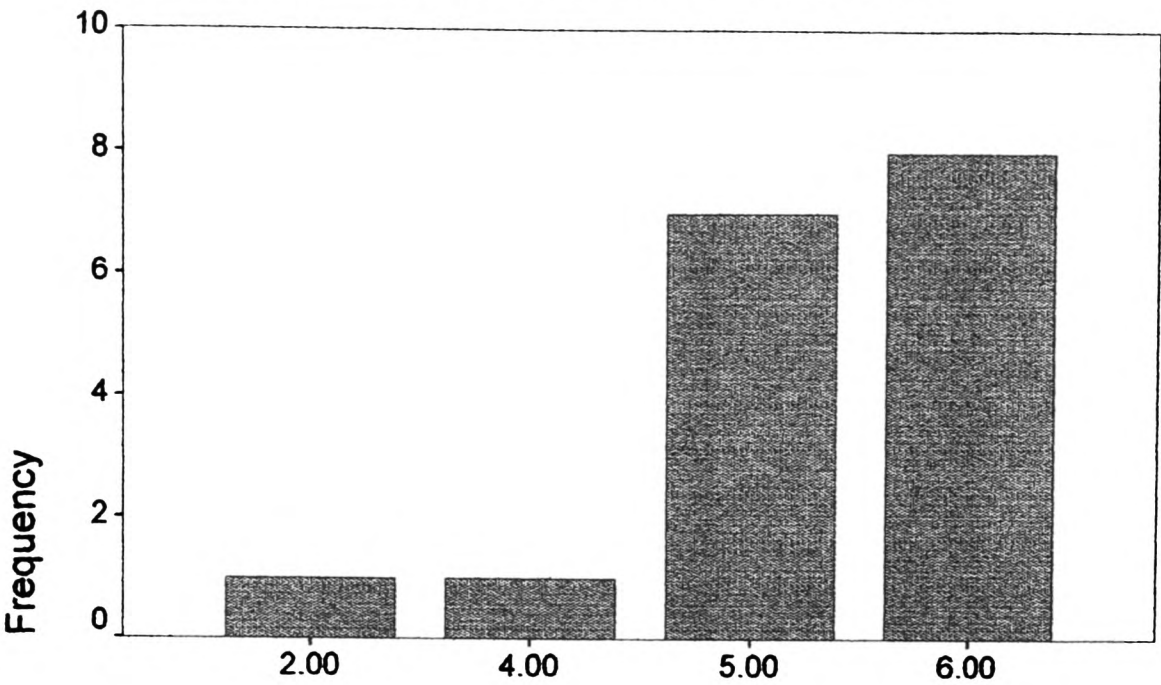
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q30

q31

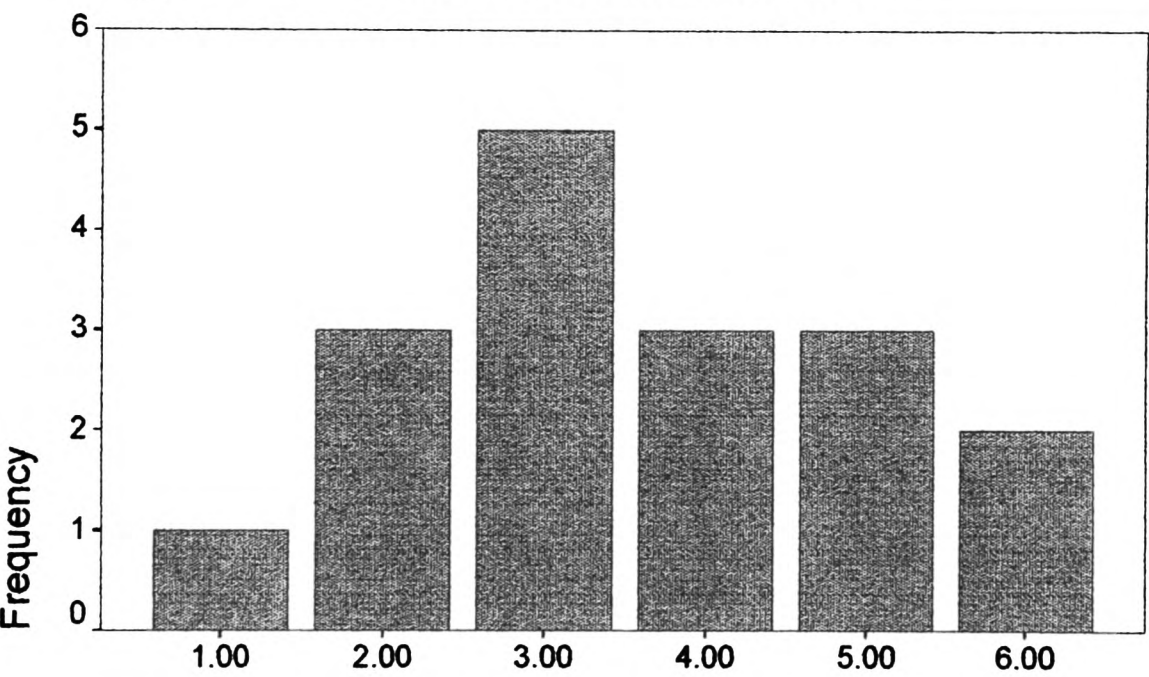
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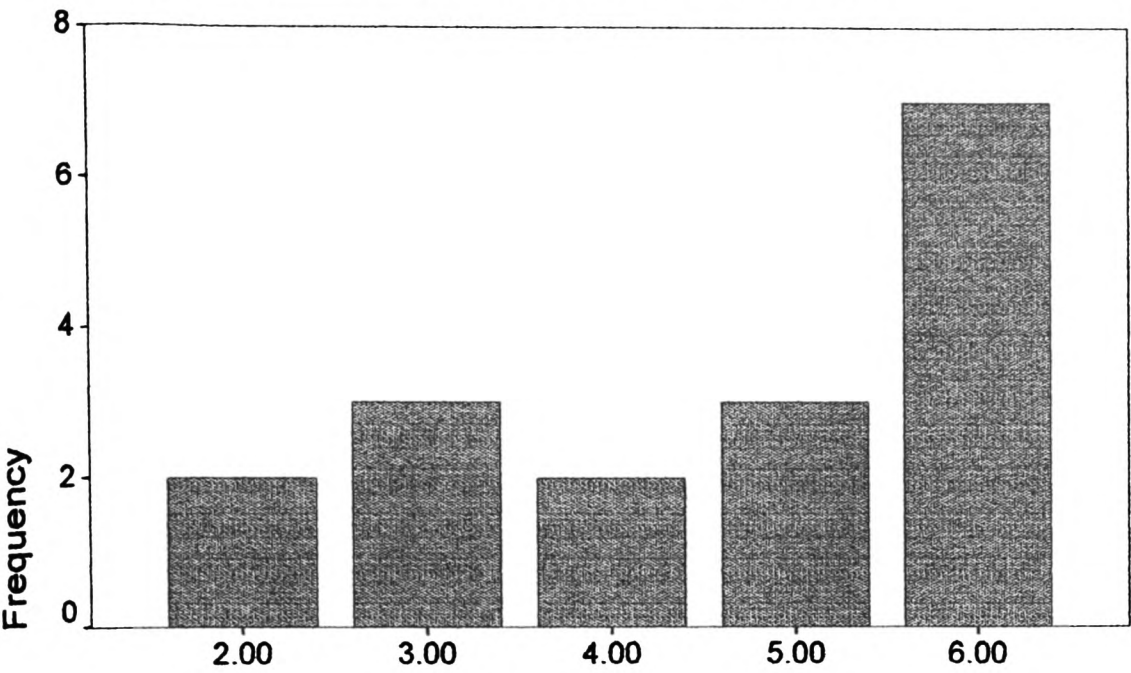
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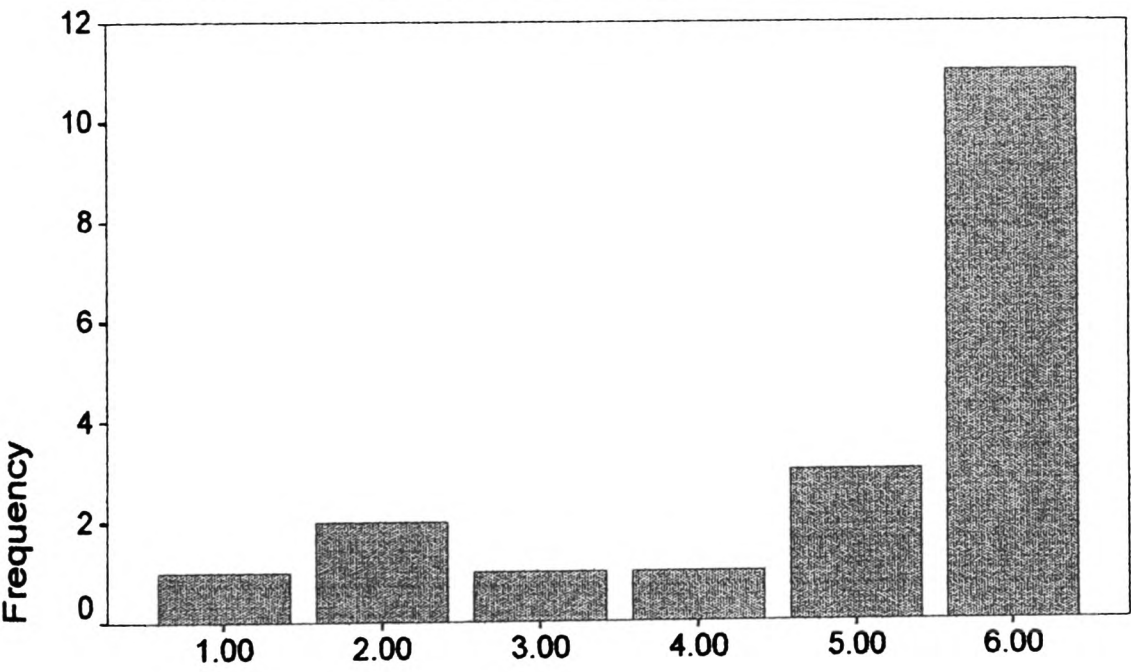
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q33

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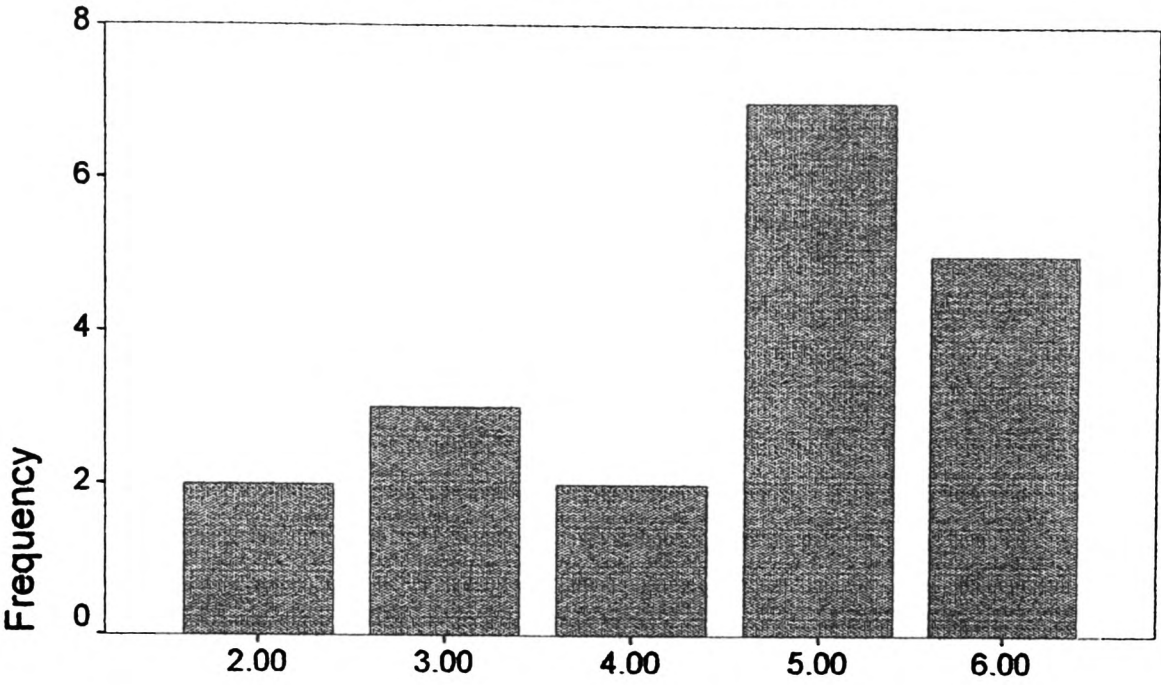
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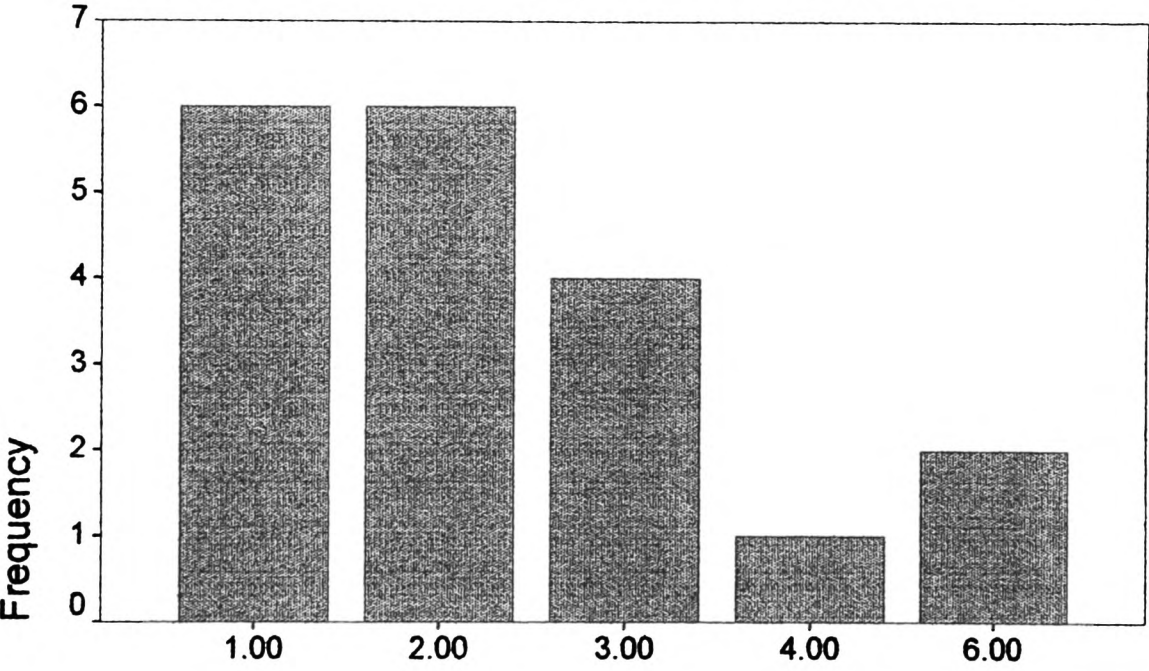
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q35

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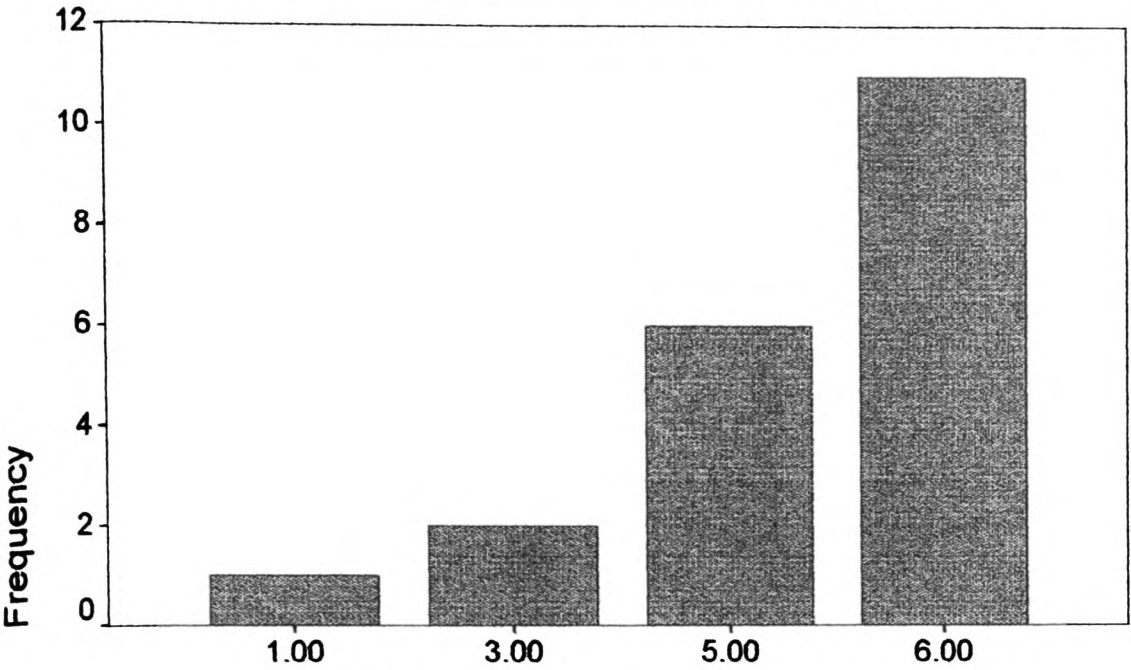
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q36

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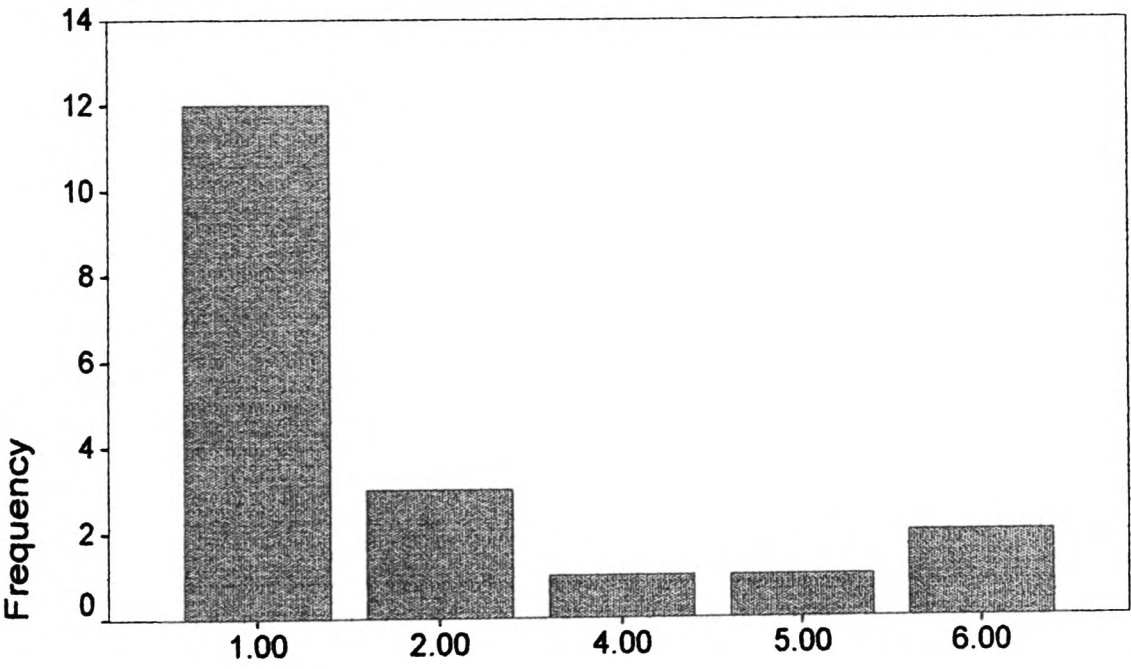
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q37

q38

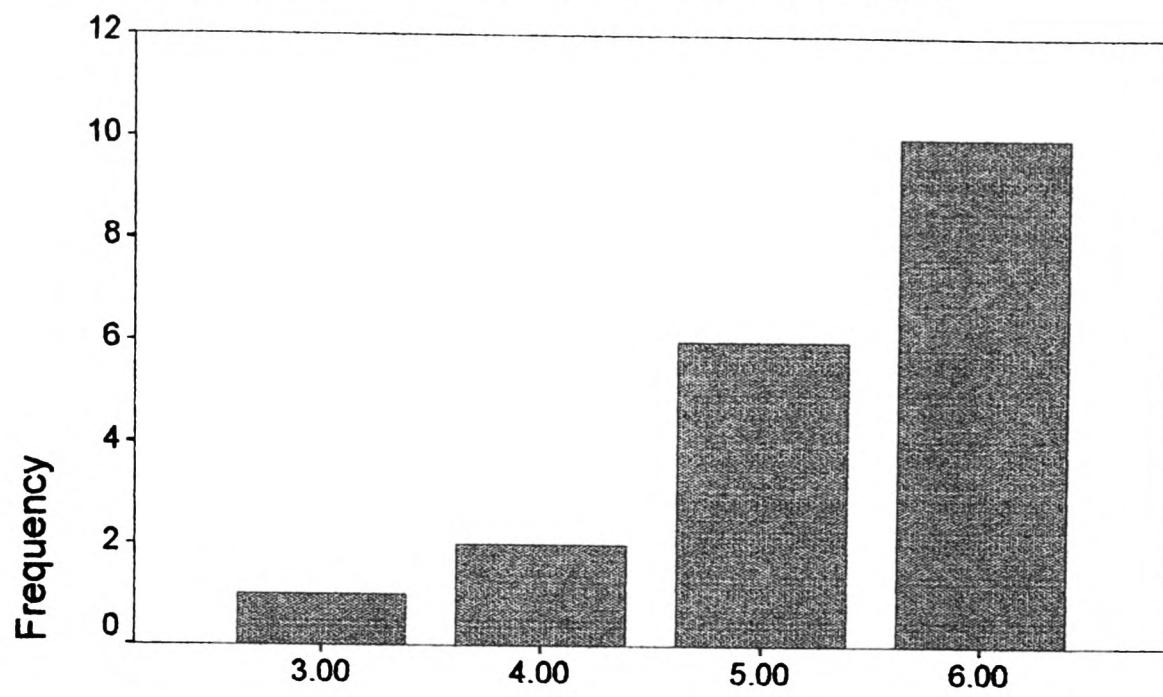
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q38

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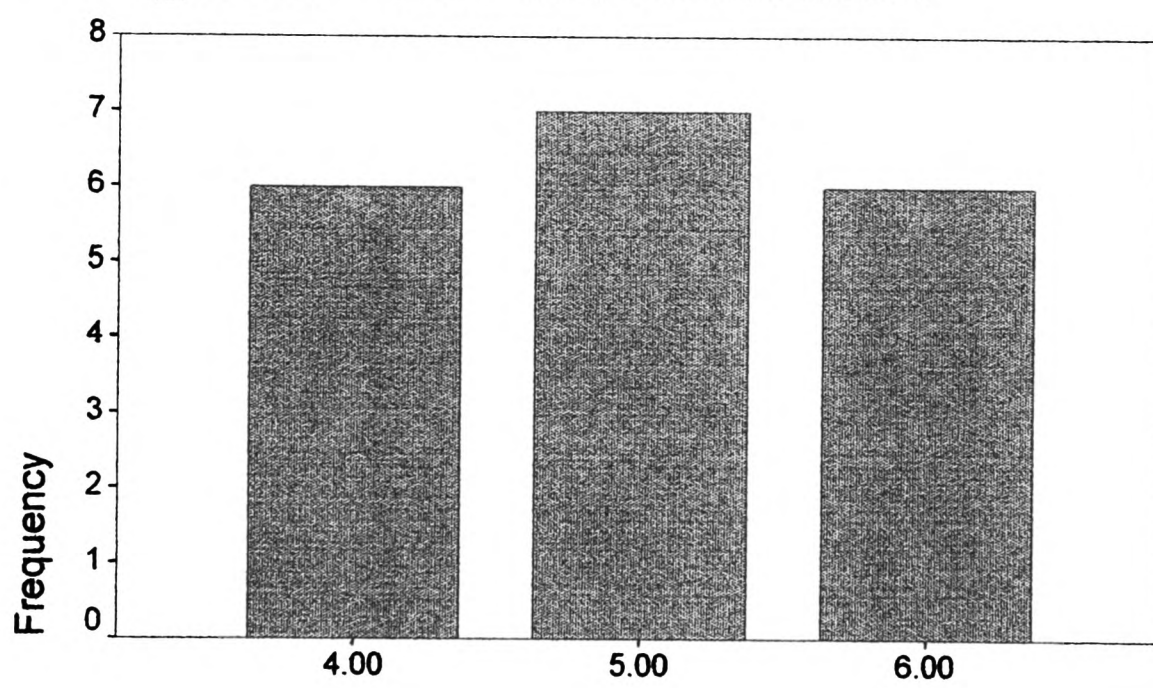
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q39

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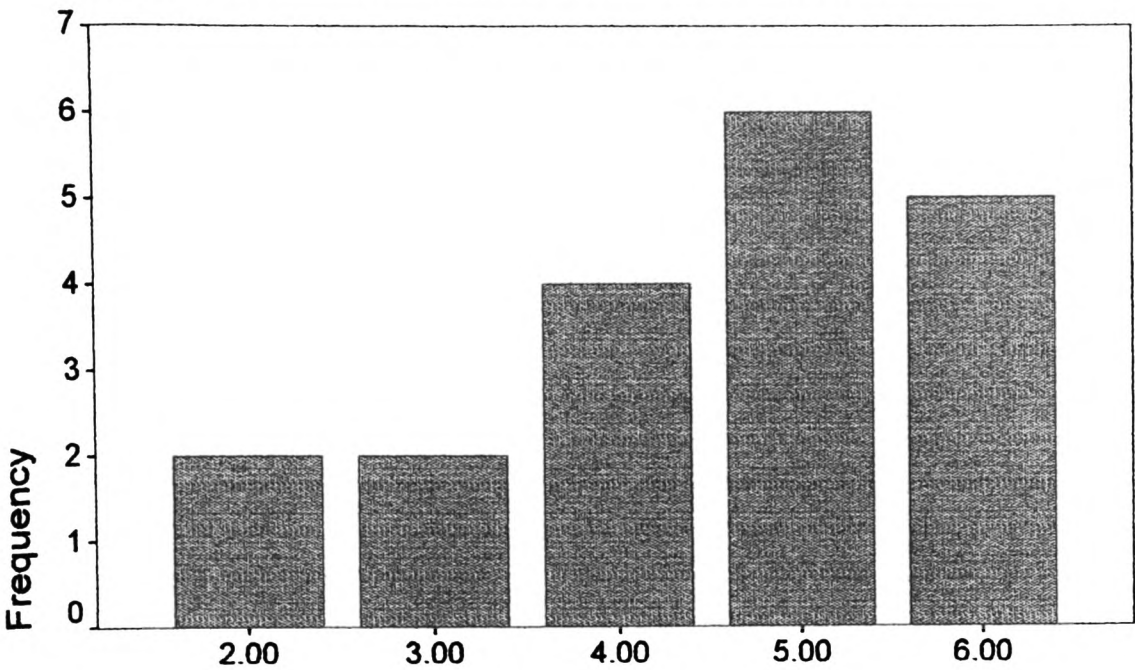
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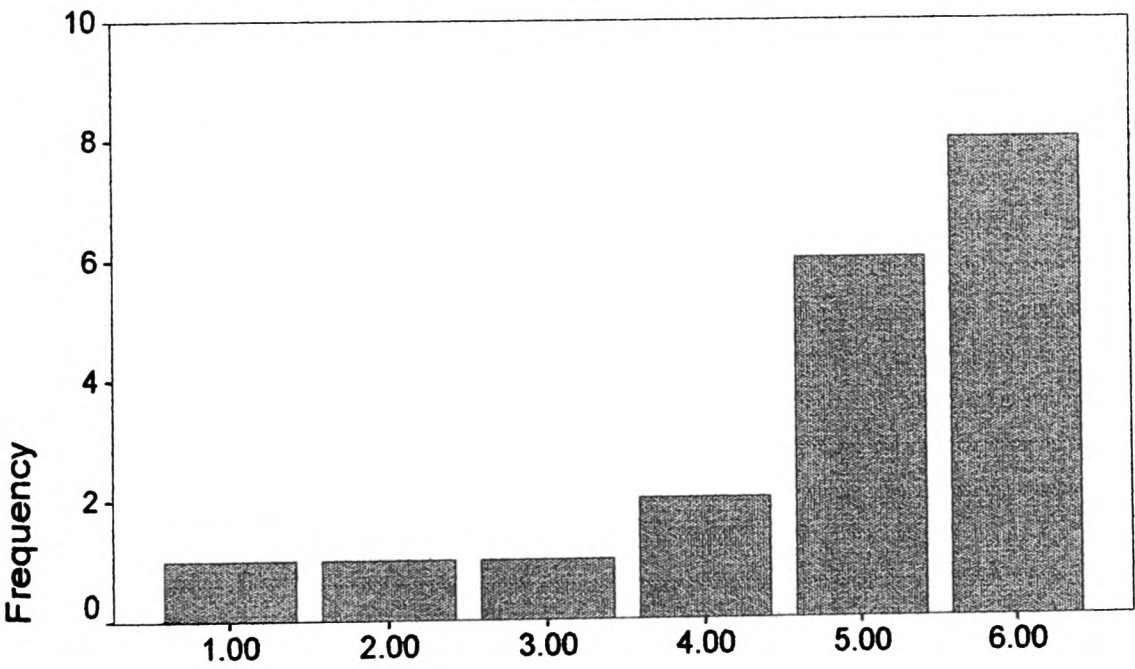
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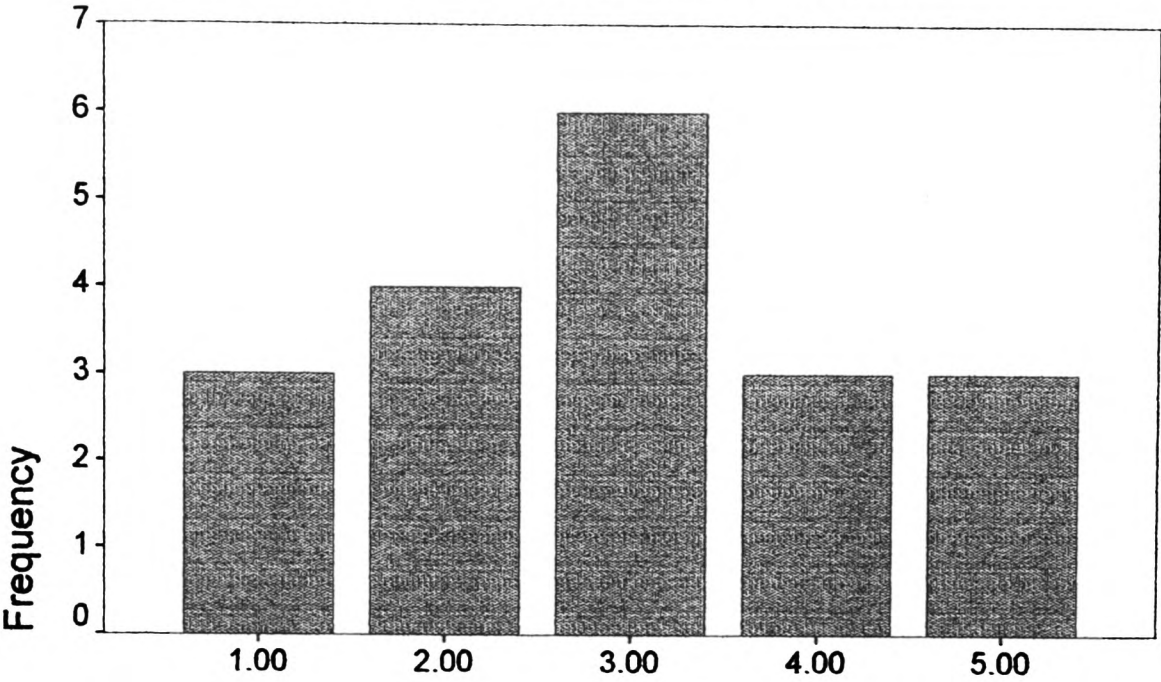
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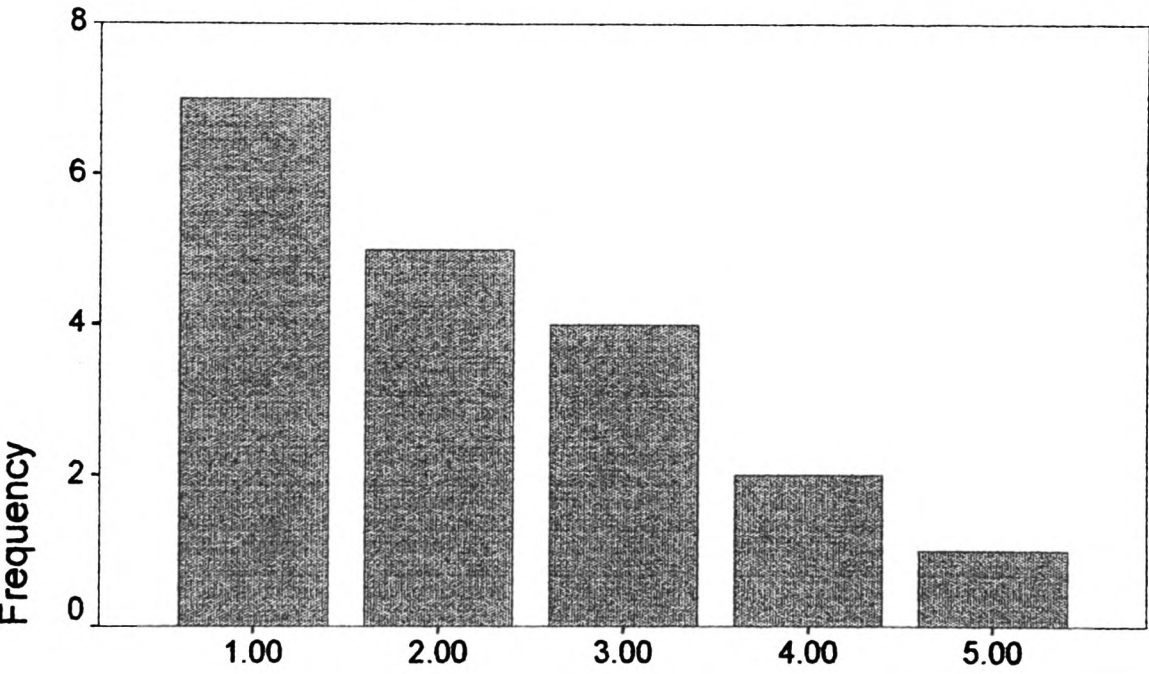
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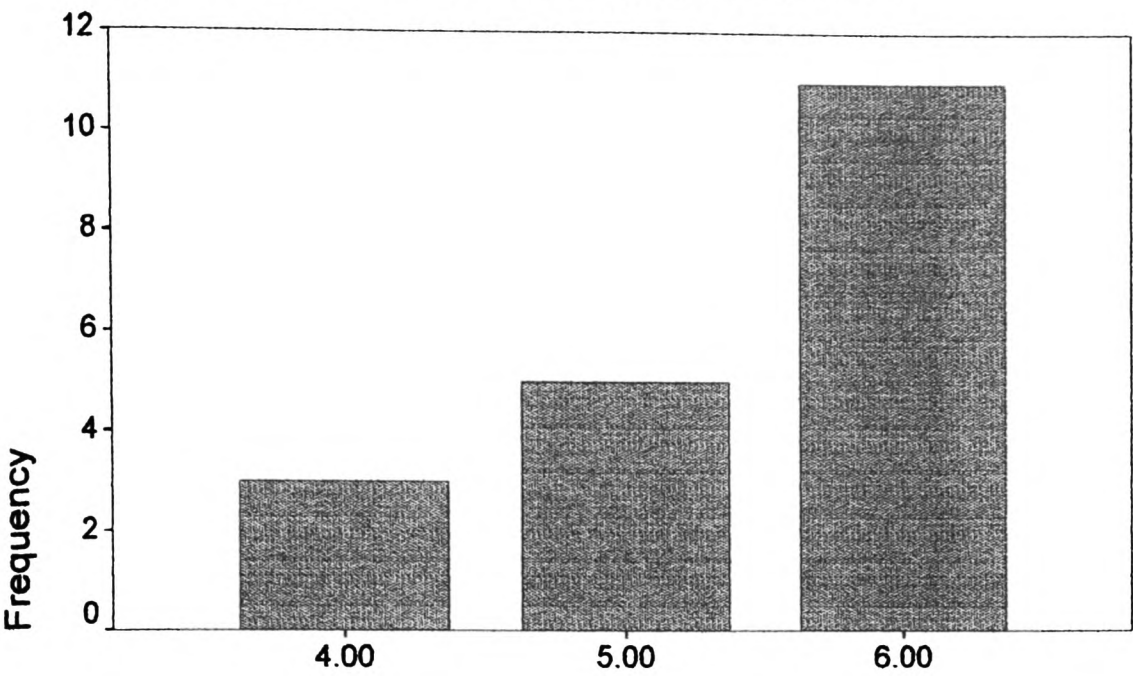
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q44

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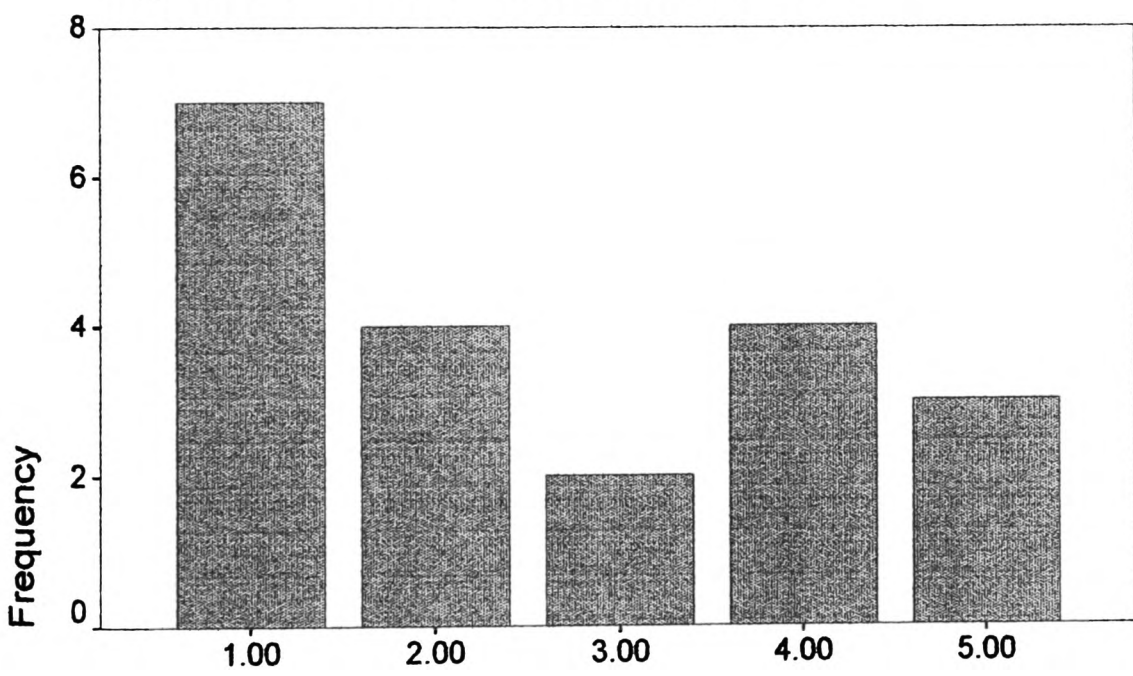
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q45

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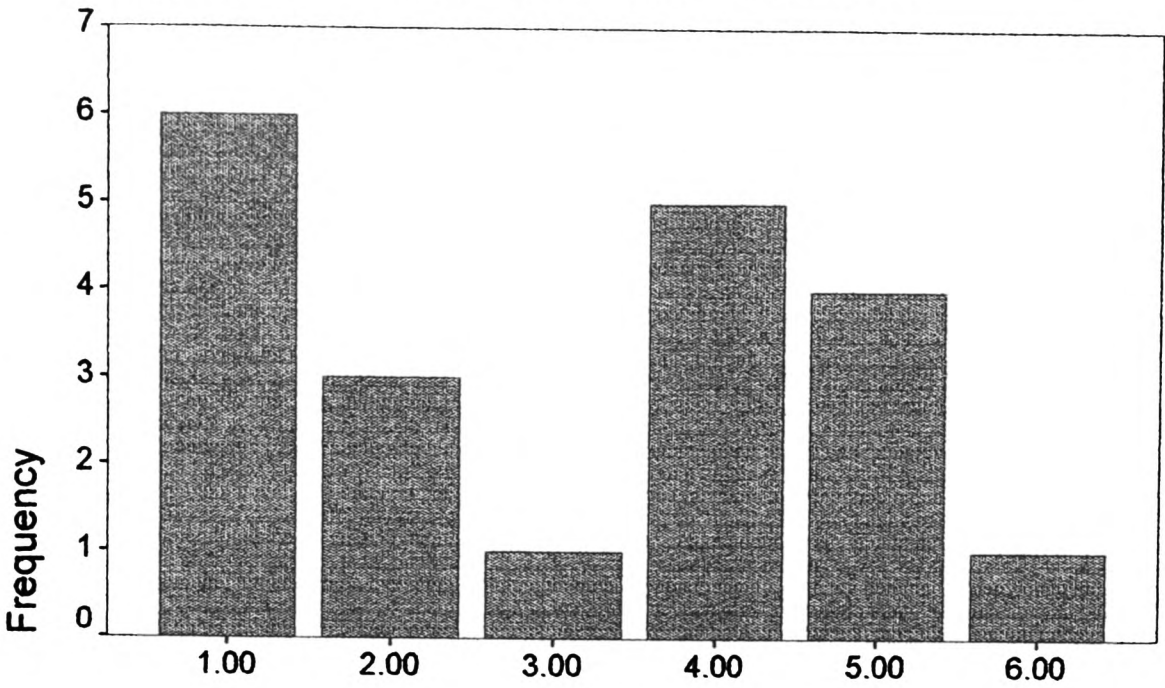
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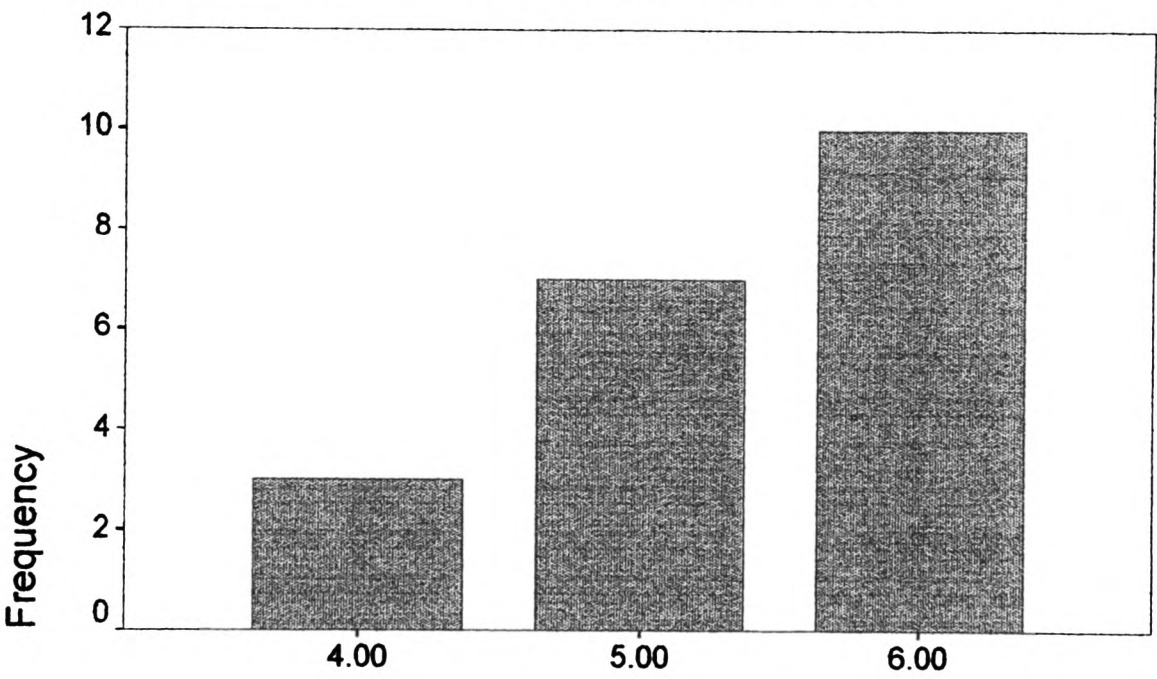
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q47

q48

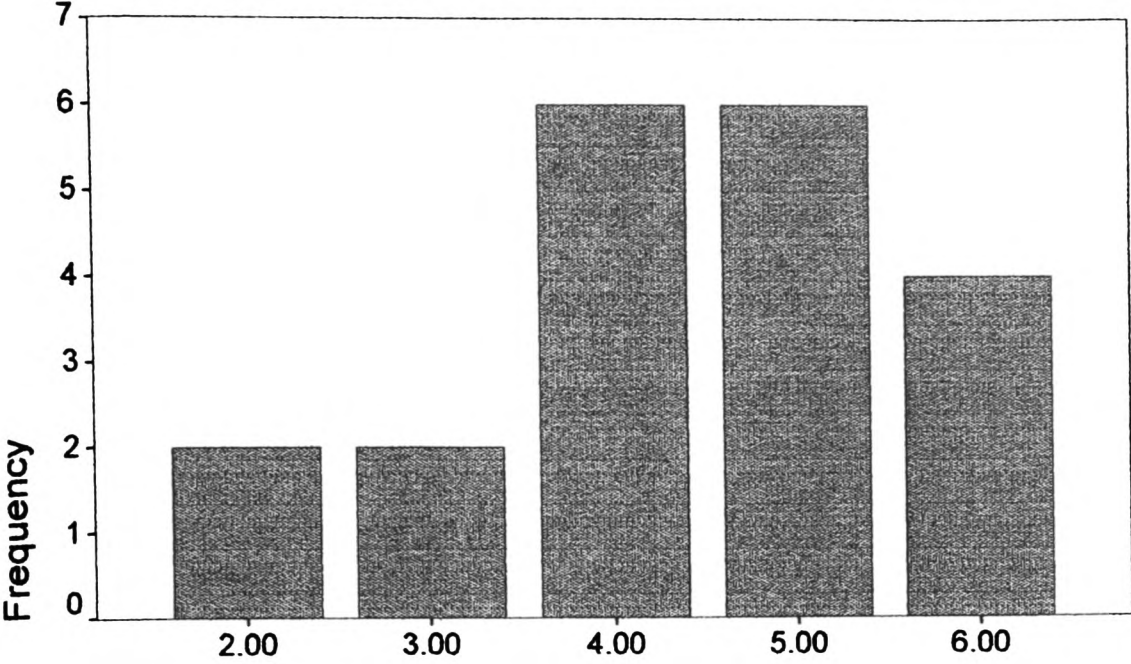
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q48

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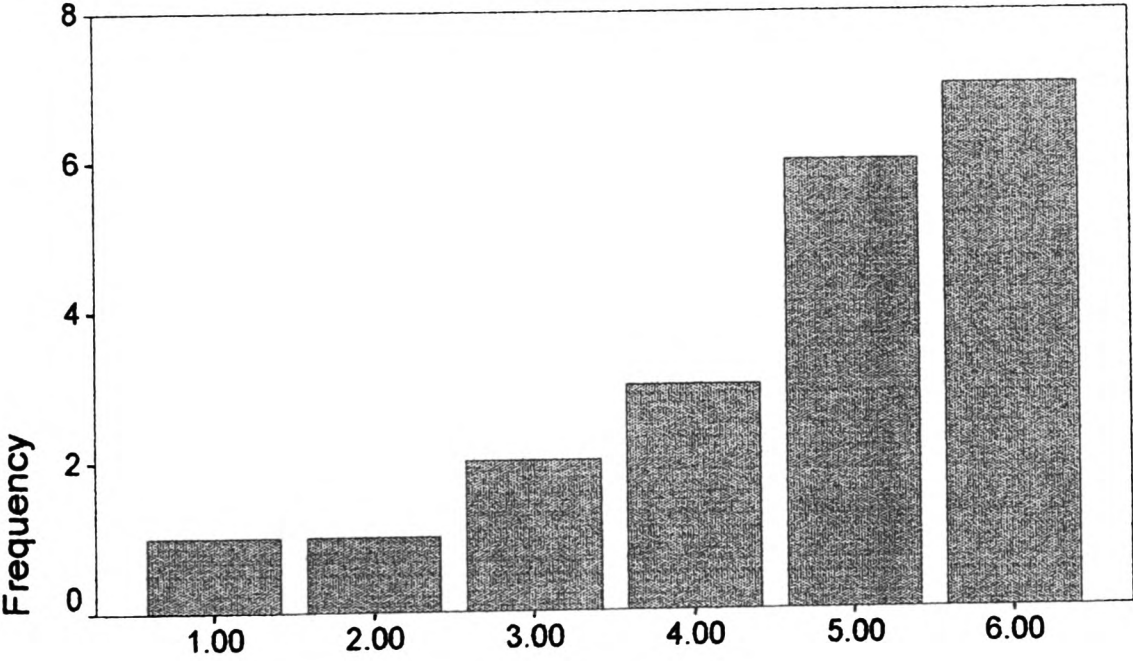
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q49

q50

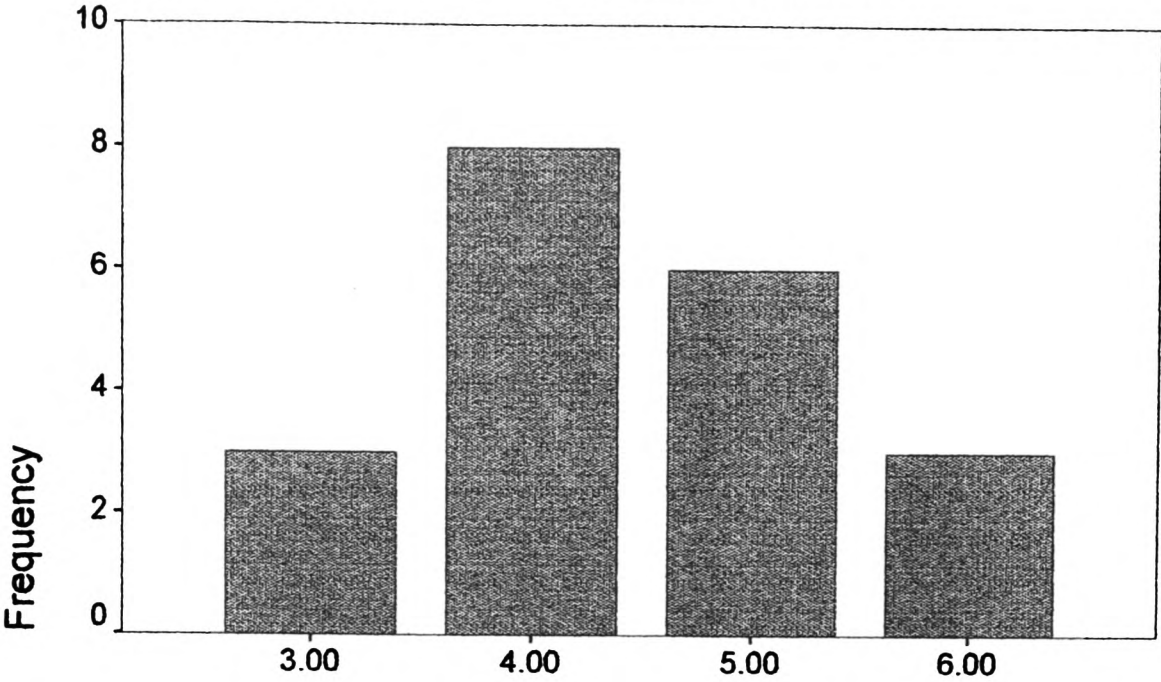
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q50

q51

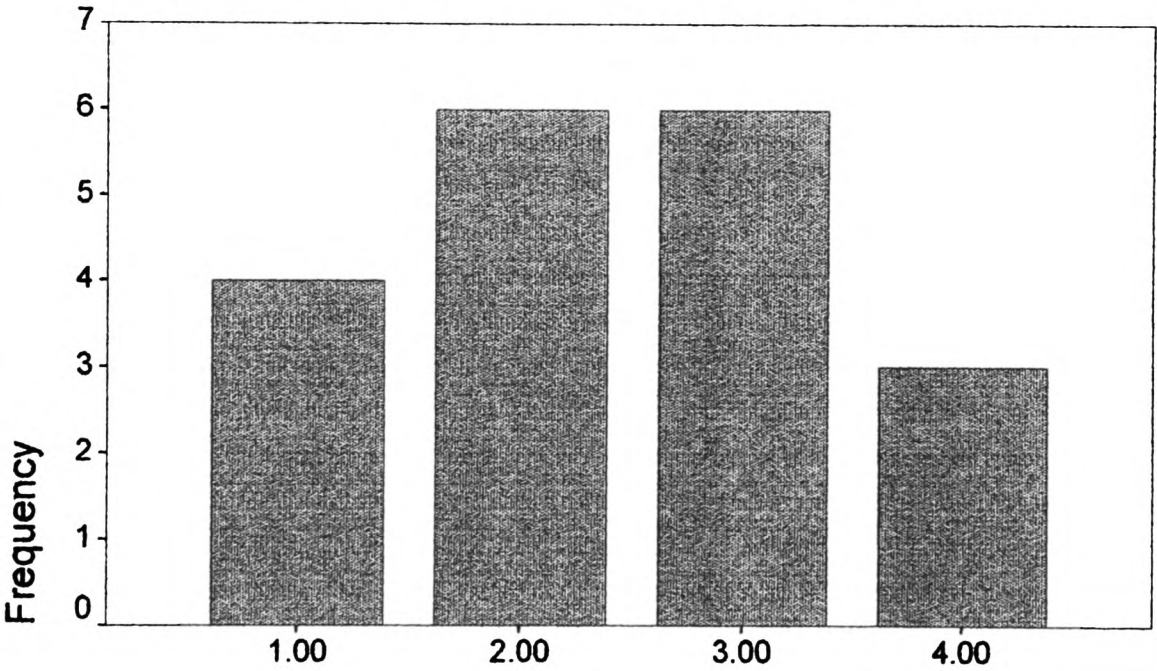
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q51

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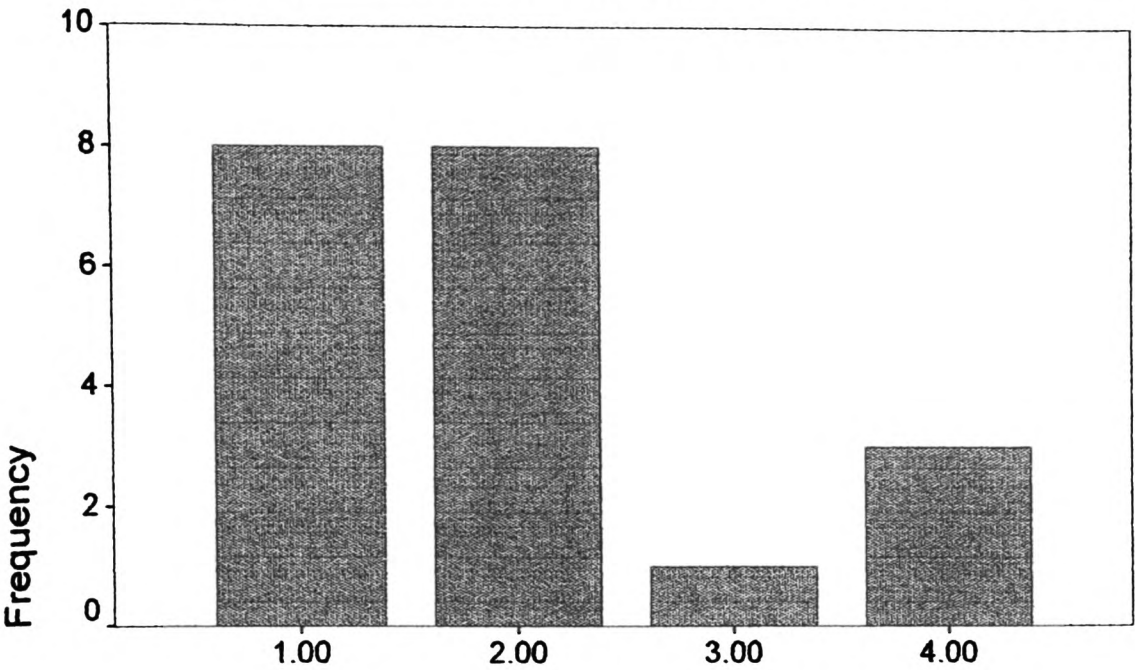
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q52

q53

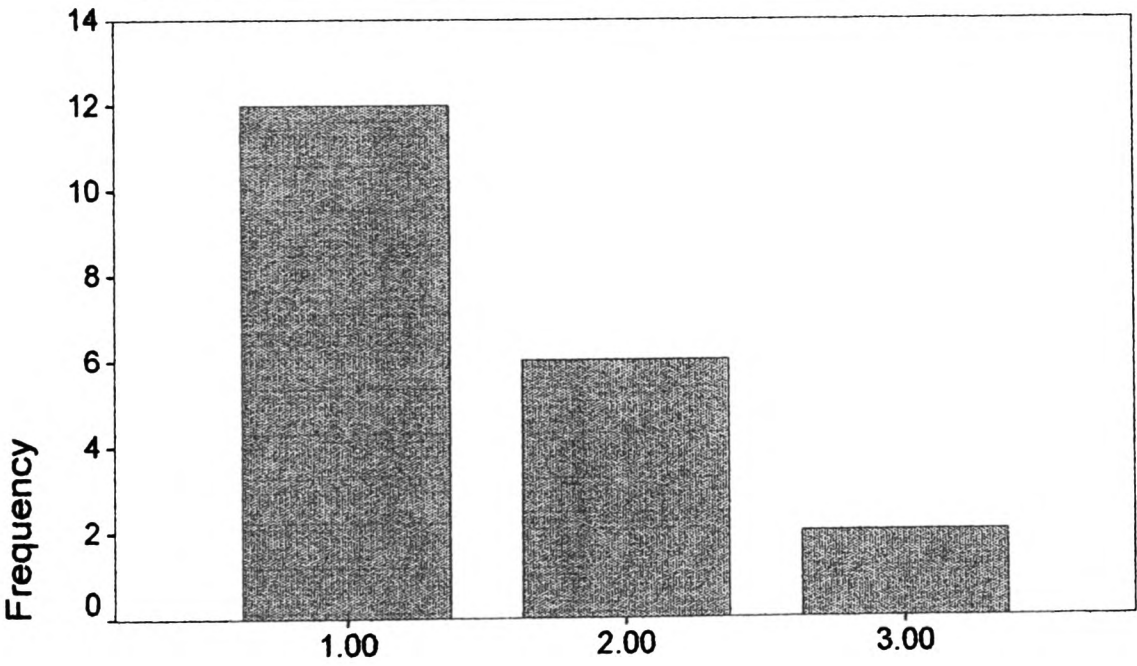
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q53

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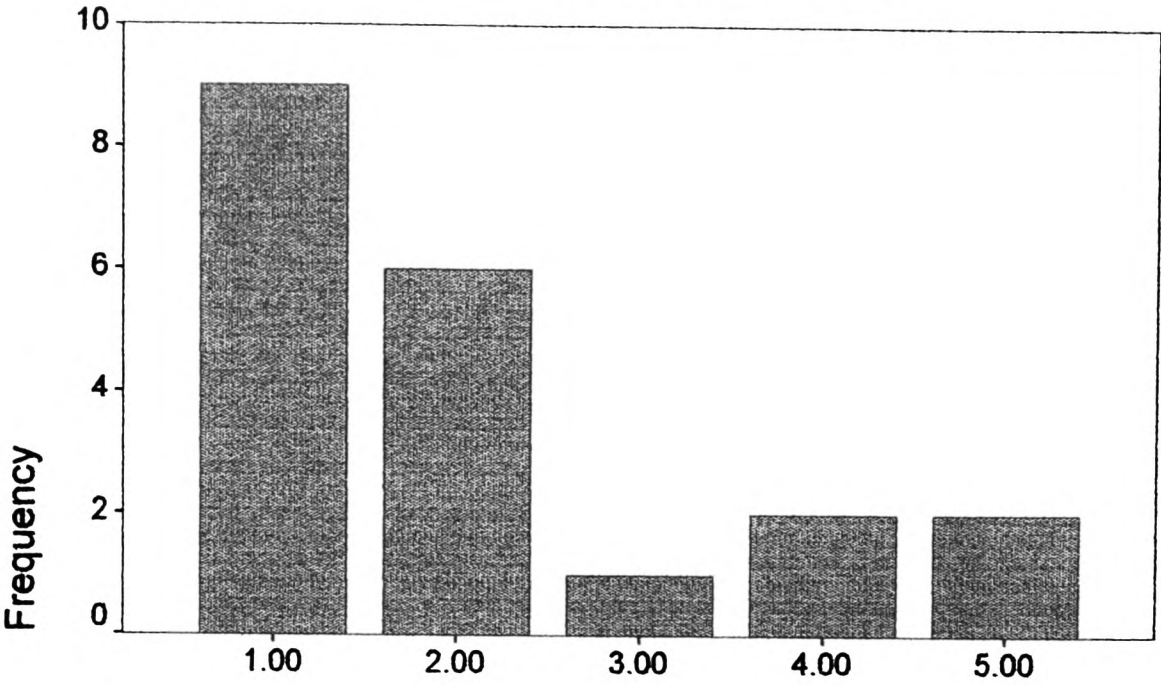
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q54

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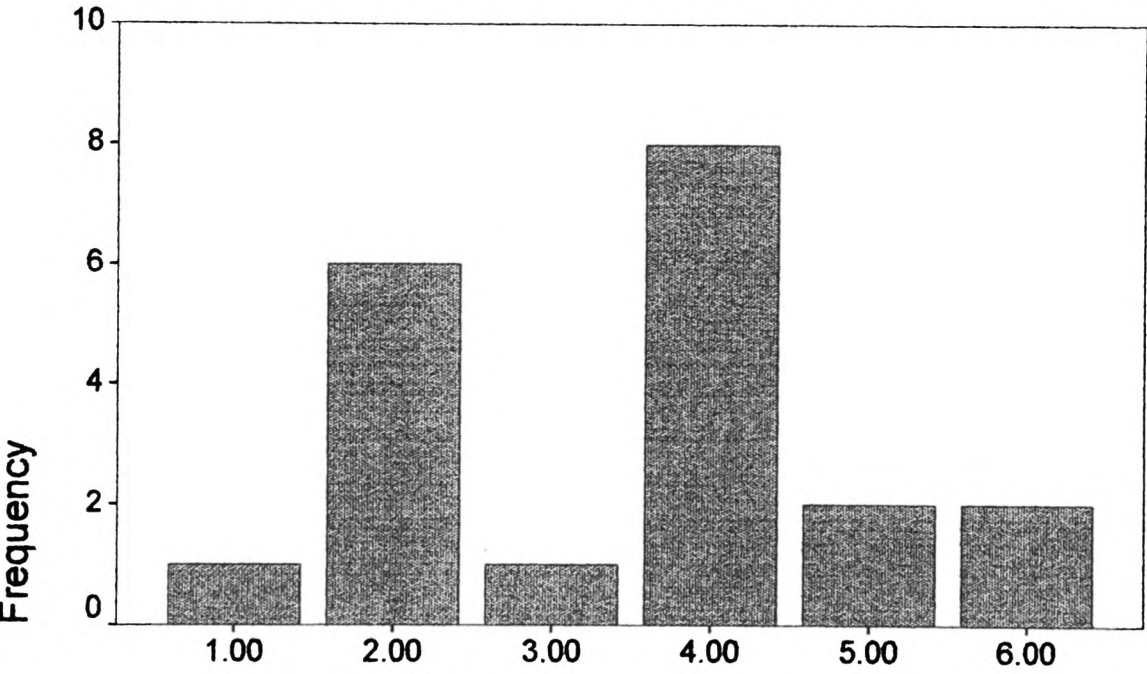
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q55

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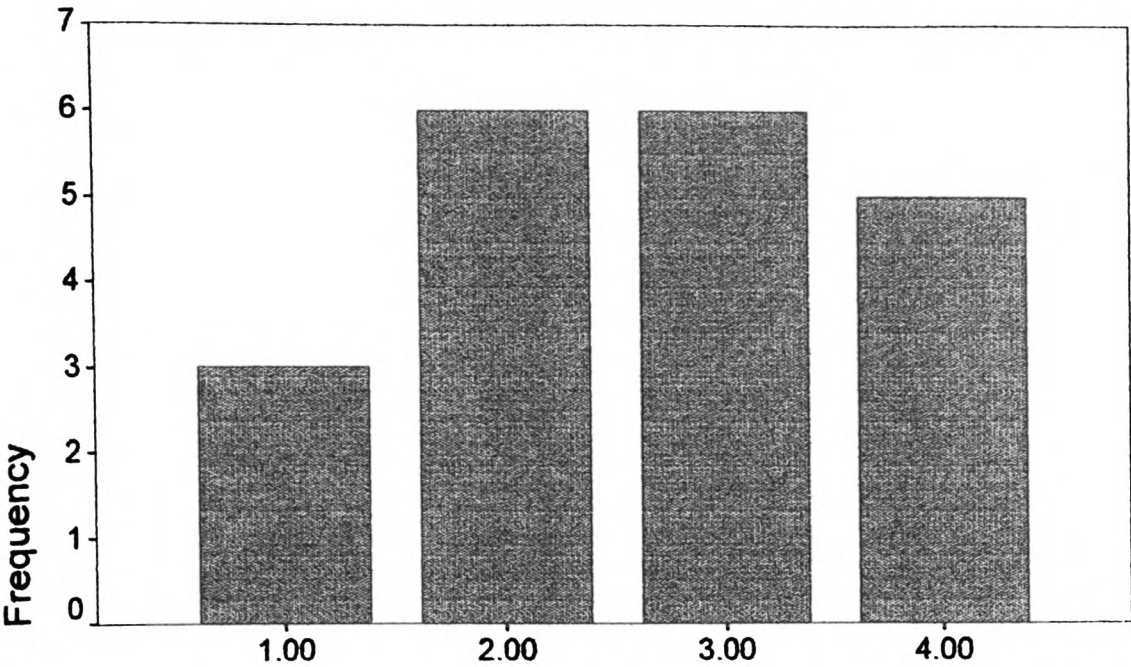
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q56

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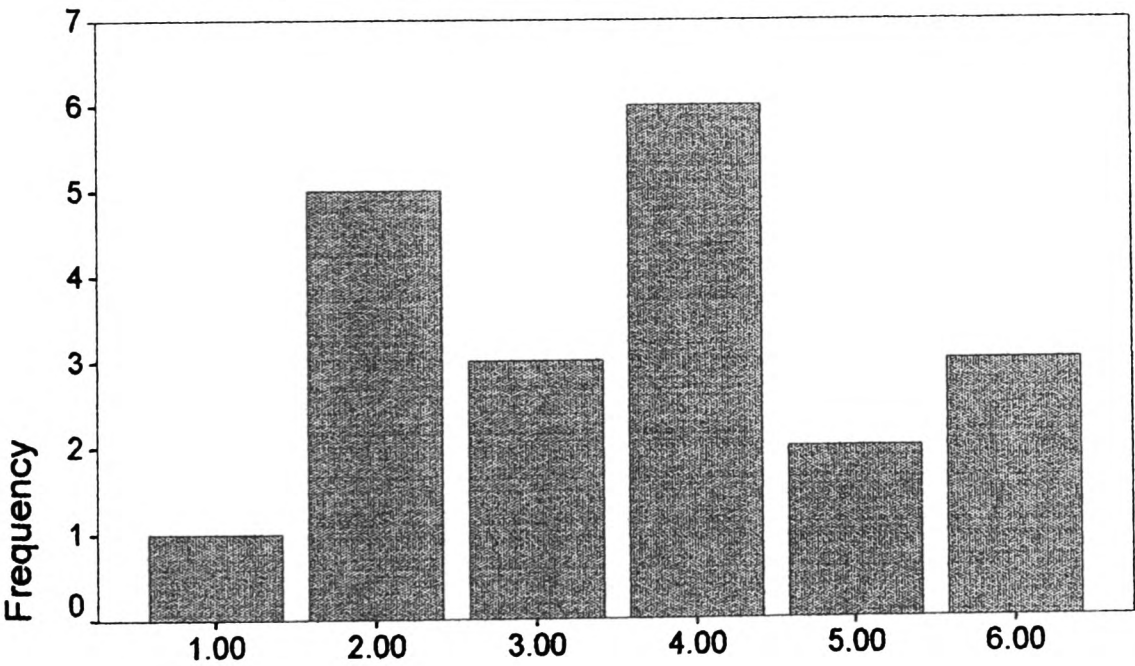
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q57

q58

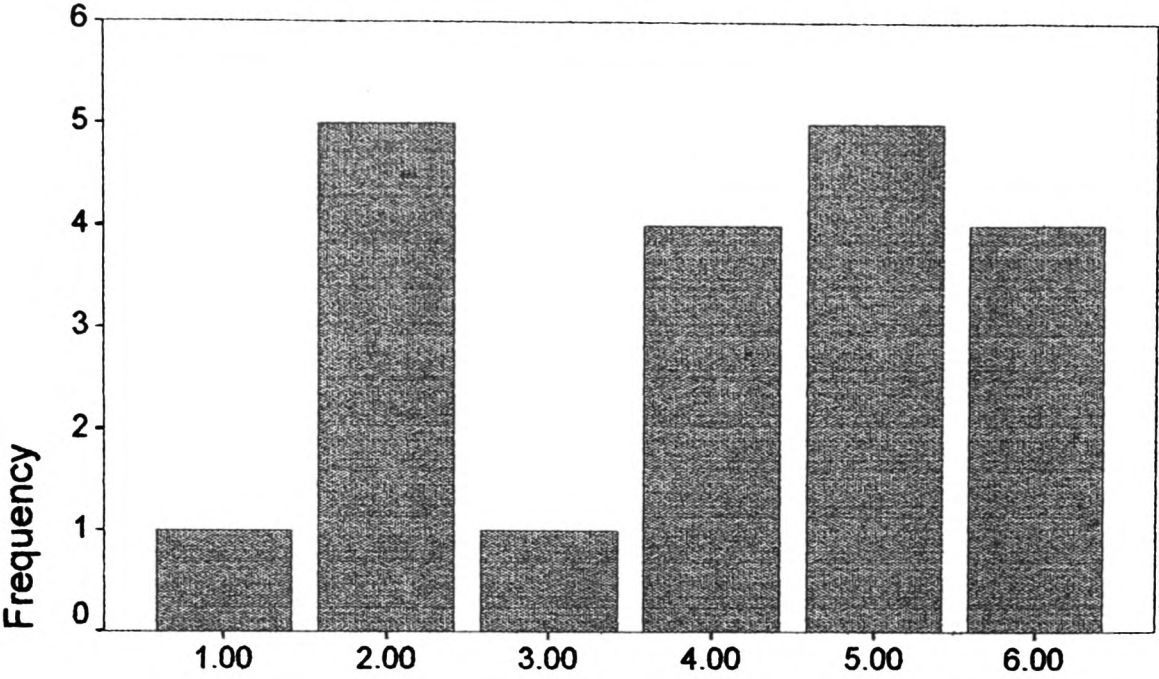
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q58

q59

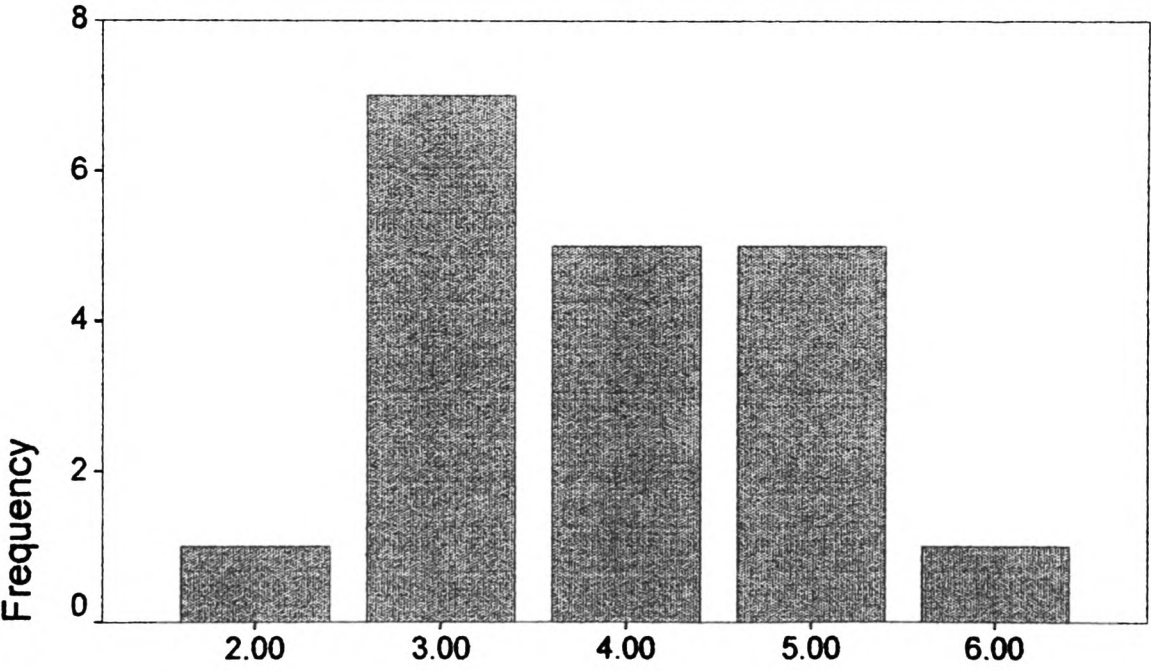
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q59

q60

Q_TYPE: 6.00 Waseda fwd level 1



q60