

CHAPTER II

LITERATURE REVIEW

This part describes the review of related literature on hedging devices and oral presentation as well as the theoretical framework and ideas in conducting the research.

2.1. Hedging Devices

In daily language, words like '*sort of*', '*well*', '*you know*' and other words that do not really have 'clear' meaning are frequently used. These words are described by Lakoff (1972) as 'hedges'.

2.1.1. Definition of Hedges

To begin with the origins of hedging, Lakoff's article "Hedges: a study of meaning criteria" discussed the problems of vagueness and fuzziness in language and he was the first to define hedging by applying the term 'hedge' to those words "whose job is to make things fuzzier or less fuzzy" (Lakoff: 1972). Lakoff popularized the concept of hedges even though Weinreich (1996) initially wrote about hedging in the linguistics research literature. As cited by Fraser (2010), he argued that

"For every language "metalinguistic operators" such as (in) English true, real, so-called, strictly speaking, and the most powerful extrapolator of all, like, function as instructions for the loose or strict interpretation of designata."

At the time, hedging referred only to expressions such as *kind of*, *sort of* or *rather* which could be used to, for example, “modify a degree of membership” (Markkanen and Schröder 1997). However, Lakoff’s concept of hedging then followed by other linguists which also make its definition varied. Lyons (1977), Coates (1987), Markkanen and Schröder (1989) and Hyland (1998), for instance, generally have the common thought on defining hedging and agreed that hedges “express a lack of commitment to the truth of something the speaker utters” (Riekkinen: 2009). Brown and Levinson (1987) in their concept of politeness considered hedging as the way “to soften the force of the speaker's utterance in order to make it more acceptable to the hearer”, which the idea is similar to Nikula’s (1997), who considered hedging as “a communicative strategy” in its definition.

Then it was Mauranen (2004) who has broader view on hedging, considering that it is not only a semantic phenomenon but also a pragmatic one. It carries an idea that “hedging does not merely refer to words that create vagueness in a sentence meaning”, as in Lakoff’s idea, but implies “further effect on both speaker and hearer after the utterance”. That is why hedging is also considered as “a way of conveying interpersonal messages in spoken interaction” (Riekkänen: 2009).

In line with those ideas, Fraser (2010) viewed hedging as “a rhetorical strategy that attenuates either the full semantic value of a particular expression or the full force of a speech act”. The word ‘strategy’ makes hedging nowadays is used as a technique in communication, either to make assertion on particular things, or to make other people, in this case the listeners, do or act what the speaker want them to.

2.1.2. General Classification of Hedging

Since hedging is defined with variety of views, either based on its form or its function, classifying hedging into certain fixed division is a bit difficult. Riekkinen (2009) tried to see hedging classification based on two categories, “form-based and function-based”, which draw better image in understanding hedging division, because when it is divided only based on certain lexical form, it does not cover its functions or vice versa.

Based on its lexical form, most researchers thought that there is no clear-cut list of hedging devices since it is perceived as hedging only when it occurs in context. Therefore, any parts of speech or word classes, phrasal categories, and all syntactic categories can be hedging devices. Clemen (1997) affirmed this in his comment:

“There is no limit to the linguistic expressions that can be considered as hedges. The difficulty with these functional definitions is that almost any linguistic item or expression can be interpreted as a hedge . . . no linguistic items are inherently hedges but can acquire this quality depending on the communicative context or the co-text. This also means that no clear-cut lists of hedging expressions are possible”.

With this view, hedging itself seems to be a free element in people’s speech. Therefore, some words, phrases, or expressions called as hedging devices can only be when the use of them is appropriate and when it is established in certain contexts, which again show how function plays an important part.

Eventhough hedging can be in any form of grammatical classes, Clemen stated that several researchers agreed upon some forms considered as hedging devices, as cited and by Riekkinen (2009) with her additional examples, they are “copulas other than be (*The*

result appears to be that...); lexical verbs (*The result suggests that...*); modal verbs (*The result might be that...*); probability adverbs (*The result possibly is that...*); and probability adjectives (*It is possible that the result...*)”.

Riekkinen (2009) also added other forms of hedging besides those core forms, they are: “all clause initial adverbs (Skelton 1988); all devices suggesting an alternative (Myers 1989); lexis expressing personal involvement (Salager-Meyer 1994); and *if* clauses, time adverbials, and passives (Hyland 1994)”.

It can be seen that hedging devices are actually ‘open’ and almost can be any of syntactic categories in language. Thus, the meaning can only be interpreted as hedging when it occurs in proper context and those examples above cannot be simply judged as hedging when they are put in the sentence without any intended message behind its surface structure.

Despite of its unclear forms in lexical categories and its dependence on certain contexts, hedging can be classified based on its function, or we can say, based on the idea of what it shows in its utterance. Fraser (2010) pinpointed the general classification of hedging, “propositional hedging and performative hedging”. He considered that Lakoff ‘s idea (1973) with his ‘degrees of truth’ in category membership refers to ‘propositional hedging’ that “involves the propositional content and affects the truth condition of the proposition conveyed” (Fraser: 2010), as can be seen in the following statements:

- a) A robin is *sort of* a bird. [false, no questions it’s a bird]
- b) A chicken is *sort of* a bird. [true, or very close to true]
- c) A penguin is *sort of* a bird. [true, or close to true]

d) A bat is *sort of* a bird. [false, or very close to false]

e) A cow is *sort of* a bird. [false]

(Lakoff: 1973)

This ‘degree of truth’ is taken from the truth value of particular things. Like in the examples above, the value being discussed is the birdiness of robin, chicken, penguin, bat, and cow. If we put these objects in a hierarchy, it can be seen that the highest birdiness value is on robin, whereas the lowest one is on cow, which we can say has no value of birdiness.

The second classification of hedging, which was not clearly discussed by Lakoff, and later being developed by Fraser (1975) and Brown and Levinson (1987) is ‘performative hedging’ that “involves the relationship between the propositional content and the speaker and serves as an index of the commitment of the speaker to the truth of the propositional content conveyed” (Fraser: 2010), which is later called as ‘speech act hedging’ as in example:

‘I *must* ask you to leave now’

When the speaker ommits the modal ‘must’, the listener might ‘sense’ the force or negative attitude of the speaker towards the listener. While putting the modal ‘must’ reduces the sense of forcing and however can be perceived as a ‘request’ in more positive way by the listener. Thus, “modals like *must* or *should* contributes towards a higher degree of politeness in several ways” (Wilamova: 2005).

On the other hand, Wilamova (2005) viewed Fraser’s classification of hedging as pragmatic markers is too general and needed to be reorganized (Riekkinen: 2009). Thus,

she broadened Fraser' hedging concept, then suggested new classification and characterization of the hedging devices consisting of: "subjectivity markers, clausal mitigators, downgraders, tentativizers, pragmatic idioms, hedges on politeness maxims, and performative hedges".

First, Wilamova (2005) concerned on pragmatic markers that "allow speaker to soften the content of the utterance" which indicates that the message should be viewed by the hearer just as the speaker's personal view and that the addressee has the possibility either of replying or of a different opinion, which she considered as speaker's subjectivity. That is why she categorized it to 'subjectivity markers', that can be used for "showing disagreement (reservation or refusal), suggestion, and uncertainty and indecision" (Ibid: 2005).

Then the next group is what she called 'clausal mitigators' which also weaken the utterance. According to Fraser, the speaker uses them with the purpose of "face loss reduction"(Fraser: 2010). It is divided into two groups, 'pseudo conditional' and 'but-clause'. Wilamova claimed that "the if-clause in *pseudo-conditionals* is usually situated in the position of the afterthoughts and purposely employed with the intention of softening the foregoing part of the utterance that might be viewed as imposition" (Riekkinen: 2009).

The other classification used in speech for expressing "hesitation, uncertainty or vagueness", is which Wilamova called 'tentativizers'. It has two subdivisions, *markers of hesitation*, that seem to be a little bit similar to subjectivity markers and *markers of intentional vagueness*, which "shows speaker's unstated meaning by not telling the

whole truth in the statement's content" (Urbanova: 2003). It is followed by concept of addresser-oriented markers, 'downgraders', that "makes possible to express the negative meaning indirectly, and targets to reduce the imposition which goes hand in hand with negative politeness, minimizing imposition" (Wilamova: 2005).

The last three classifications are 'pragmatic idiom' that "shows the addressee how the message should be understood by weakening the propositional context through making the message more hesitant or by softening the face threat" (Wilamova: 2005). It usually uses '*perhaps*' or '*maybe*' that "indicates that the speaker is not so sure about the solution he/she has just suggested" (Ibid: 2005). Then 'hedges on politeness maxims', hedges that are "purposely used for the attenuation of the face-threat for example when conveying an unpleasant message, e.g.: '*You don't mean to tell me that he's been cheating on you?*'" (Ibid: 2005), and 'performative hedges', "speaker-oriented" hedging devices that "introduce and mitigate a content of the proposition that goes immediately after them, even give the addressee time to create his/her attitude and answer" (Ibid: 2005) which is more or less similar to Fraser's performative hedging.

2.1.3. Hedging Classification in Academic Discourse

However, in relation to academic discourse, Prince et al (1982) also made a clear explanation on the hedging classification. They classified hedging world into two classes, in which each classes has two subclasses.

The first group is called 'approximators' which "operates on the propositional content proper and contribute to the interpretation by indicating some markedness, that

is, non-prototype, with respect to class membership of a particular item” (Fraser: 2010). This class is divided into two subclasses, *adaptors*, “which relates to class membership” (Ibid: 2010), like *somewhat* or *sort of* that can be considered similar to propositional hedging in Lakoff’s ‘degree of truth’, and *rounders*, which “conveys a range” (Ibid: 2010), like *about* or *approximately*. The hedging in both subclasses expresses the truth or close the actual condition eventhough it is not exactly true.

The second group is called ‘shields’ which “changes the relationship between propositional content and the speaker by implicating a level of uncertainty with respect to speaker’s commitment” (Fraser: 2010). Prince et al (1982) also subdivided it to two, “*plausibility shields*, which expresses doubt, like *I think*, *probably*, or *possibly*” (Ibid: 2010), that when the speaker do not use this shield in a statement, it can be considered that the speaker is sure about the statement he/she makes, and “*attribution shields*, which indicates the responsibility of the message is on someone other than the speaker, like *according to*” (Ibid: 2010), that is usually used when a speaker uses the information taken from others’ ideas or statements.

Some other linguists also tried to make division in hedging, such as Hubler (1983) who described two classes in hedging, ‘understatement’ and ‘hedges’, eventhough the idea of both classes more or less similar to Prince et al, where ‘approximators’ corresponds to ‘understatement’ and ‘shield’ correponds to ‘hedges’. It was Caffi that later wrote about ‘mitigation’, “the attenuation of unwelcome effects on the hearer” (Caffi: 1999), and proposed a mechanisms in mitigation, in which others call as hedging devices, based on her view of “the three components of the utterance on which

mitigation can operate: the proposition, the illocution, and the utterance source” (Fraser: 2010). Caffi labeled them as ‘bushes’, ‘hedges’, and ‘shields’. Her concepts is also similar to Prince et al’s, but she affirmed that mitigation is different from politeness, as cited by Fraser (2010).

“Far from being limited to a matter of politeness, mitigation captures a rationally grounded behavior which is chiefly aimed at avoiding unnecessary risks, responsibilities and conflicts. At the same time, mitigation indexes the type of speaker we want to be taken for in a given encounter.”

Later, Meyer (1994) also made classification on hedging devices in analyzing academic discourse. Meyer developed Prince et al’s ideas with their two classifications, approximators and shields, with additional three classes she suggested, which “express the ‘authors’ personal doubt and direct involvement’ such as ‘*I believe*’, ‘*to our knowledge*’, ‘*it is our view that...*” (Ibid: 1994), in which ‘author’ can also be changed by ‘speaker’, ‘emotionally-charged intensifiers’ which is “comment words used to project the authors’ reactions such as ‘*extremely difficult/ interesting*’, ‘*dishearteningly weak*’, ‘*of particular importance*’, ‘*particularly encouraging*’, ‘*unexpectedly*’, ‘*surprisingly*” (Ibid: 1994), and ‘compound hedges’ which contains more than one hedges in a series. It can be “double hedges (It *may suggest* that ...; it *could be suggested* that...), treble hedges (It *would seem likely* that..., it *seems reasonable* to assume...), and quadruple hedges (It *would seem somewhat unlikely* that ...)” (Ibid: 1994).

In conclusion, there are several perceptions on classifying hedging and each expert might have different labels in its classification. But it can also be concluded that

whatever the terms that experts use for it, the ideas of hedging classification based on its usage in context and communication is kind of similar.

2.1.4. The Relevance of Hedging in Academic Discourse

As what Thonney considered to be ‘six standard moves’ in academic writing, which is kind of similar to academic presentation, the proper academic performance should pay attention to these aspects, “author’s/speaker’s responding to what others have said about their topic; stating the value of their work and announcing the plan for their papers; acknowledging that others might disagree with the position they have taken; adopting a voice of authority; using academic and discipline-specific vocabulary; and emphasizing evidence, often in tables, graphs, and images” (Thonney: 2011). These features are mostly achieved through the use of hedging as a tool in delivering them in a modest and mannerful way.

In addition, while delivering ideas in academic context, things like disagreement, criticism, and personal judgment that may become potential conflicts among the academic communities are difficult to be avoided. By using hedging, those potential conflicts likely to occur can be reduced since when the utterances are hedged, the ‘attack’ would sound softer and thus it shows a higher respect toward others’ ideas even though they might have different stances or views.

Hedging as a pragmatic competence is also important to be taught to students, especially in higher education. As we know that college students are highly required to produce academic papers and presentations in which these tasks mostly demand

students to be independent and teacher's guidance are very limited. But there is no clear rule for things that are non-technical (not related to certain rules like the font size, page layout, bibliography, etc) such as how the paper should be written or how the material should be presented which sometimes make students use their 'free' style in demonstrating their ideas, that is, unfortunately, might not satisfy the lecturers' expectation. The lecturers, professors, or people who are accustomed to the academic discourse might require for instance, the students' language use to be more academic which probably are not really understood by students. Thus, students might be disadvantaged with this situation since they would probably get the low score from their lecturers for this 'unclear' dissatisfaction.

However, students are already becoming the parts of academic community even though still in the smaller scale, not yet like the lecturers, scholars, or professors. Therefore, students as parts of a discourse community, which in this case is the academic discourse, should be able to participate in it well. Thus, the knowledge of hedging which also one of the pragmatic competence is essential for students to have an ethic and manner in presenting ideas among the academic community because "becoming a member of discourse community and developing discourse competence requires having linguistic knowledge, as well as knowing how to act, talk, interpret, and think according to a particular cultural or social group" (Gutierrez: 1995) or can be said as the pragmatic aspect besides the core content of the knowledge itself.

In the large scale, "scholars must sell their work to editors and reviewers, but students too must 'sell' their work to their professors" (Thonney: 2011). Students can

'sell' their work better when they have understood what the 'market' want, in which the 'market' here is the lecturers in the smaller academic community. In the end, having this kind of pragmatic competence might have good implications for learning process like it can benefit the students themselves in achieving the academic competence since they will have the ability to demonstrate their ideas appropriately as well as meet the academic 'standard' and lecturer's expectations of how the academic performance supposed to be. And more than that, students will be accustomed to this academic exposure which might help them when they become parts of the real larger academic community later.

2.1.5. Functions of Hedging in Communication

Some researchers have conducted study on hedging in certain communication contexts. It shows that hedging can be used as a tool in achieving the communication goals or simply demonstrates the speaker's ability in having the appropriate interaction and 'nice' communication. As the English major students who live in the 'academic world', the use of hedging is likely become unseparable part from academic discourse.

Eventhough previous research related to hedging in academic discourse mostly focus on academic writing or scientific writing, it shows that hedging plays significant role in academic world. Hyland argued that in academic writing, "hedges signal a writer's anticipation of the possibility of opposition to his or her statements" (Hyland: 2005). Thus, he suggested that hedges serve three main functions, "to allow writers to express propositions with greater precision in areas often characterised by rapid

reinterpretation” (Ibid: 2005), that is usually achieved by not providing the exact number of the data in their research, “to anticipate the possible negative consequences of being proved wrong and the eventual overthrow of a claim” (Ibid: 2005) as the impact presenting the number without approximators that might result a situation like for example it is found later not exactly as he/she stated, and “to contribute to the development of a writer-reader relationship, addressing the need for respect and cooperation in gaining readers’ ratification of claims that might save the researcher from the claims over his/her argument” (Ibid: 2005). All these ‘writer-reader’ subjects might also work in academic presentation which can be replaced with ‘speaker-listener’ or ‘speaker-audience’.

In addition, some researchers remarked in their researches on why hedging should be taught in academic writing, in which can also be applied in academic presentation as the delivery of research and scientific reports. They assert that knowledge on hedging “enables writer to express propositions with greater accuracy in areas often characterized by reformulation and reinterpretation and helps writers soften their statements to avoid overstated claims” (Hidayati et al: 2008). In addition, it can “assists writers to shun personal responsibility for statements in order to protect their reputations as scholars and limit the damage which may result from errors” (Ibidl: 2008). The same functions can also be useful for ‘speaker’ rather than ‘writer’ that they mentioned.

Besides, hedging might function in other aspect of human communication like politeness. Hedges as stated before may show someone’s pragmatic competence and indicate the awareness in communication. In this aspect, hedging can “reduce the

illocutionary force which then may minimize the imposition, authoritativeness or directness of speaker's utterance" (Wilamova: 2005), especially in speech act hedging. In addition, "there is the responsibility of both sides to maintain face in communication, to protect speaker's face and respect others' face" (Tang: 2013). Hedging can be used as a tool to make the 'face threatening acts' perceived much nicer and protect both side's face.

Meyer explained how people can "strengthen the argument by weakening the claim" (Meyer: 1997), which she believed is achieved primarily through hedging. When using hedging in science, claims or statement sounds "more cautious and tentative, which enhances their chances of ratification" (Ibid: 1997). It is in line with Swales's idea (1990) that hedges are "rhetorical devices used for projecting honesty, modesty and proper caution in self-reports and for diplomatically creating space in areas heavily populated by other researchers" (Riekkinen: 2009). With hedging, further conflict like when some report content is proven to be wrong later just because the scientists have to provide the exact number or data in their project can be avoided as well.

Eventhough some researchers claimed that "hedging in its various forms has spread so widely in scientific discourse that it has become a main source of what-so-called institutional fraud" (Roland: 2007), others argued that hedges are not used simply "to cover oneself and to make things fuzzy, but that they can also be used to negotiate the right representation of the state of the knowledge under discussion, i.e., to achieve greater preciseness in scientific claims" (Rounds:1981). Skelton (1988) agreed with this view that "hedges should not always be considered as a problem, as a "cover-up" tactic,

but rather as a resource to express scientific uncertainty, skepticism and doubt” (Riekkinen: 2009).

These views on hedging prove that hedging can indirectly affect speaker’s goal in communication, inside or outside academic context. Just like the functions in academic world mentioned before, having this hedging in speech, presentation, or even simple interaction might help speaker in creating more socially valid verbal action, instead of ‘sounds like too direct’ or worse, seems to be ‘stubborn’ speaker. Hence, the appropriate use of hedging may lead to achieving not only pleasant interaction in daily life but also greater goal in communication in various contexts like business, politics, marketing, public relation, and so forth by the ability needed in such contexts like requesting, persuading, convincing, and other communication goals.

2.2. Oral Presentation

Oral Presentation is delivered through speaking in which can be considered as the important skill in mastering language for it is used in direct oral communication. People cannot have a flowing talk or conversation if they are not able to speak and respond to they talk partner (interlocuter) well. When the EFL learners want to master the target language, it is necessary for them to master speaking skill in order to be able to communicate fluently.

Chaney (1998) defined speaking as “the process of building and sharing meaning through the use of verbal and non-verbal symbols, in a variety of contexts”. While Ulas claimed that it is a key of communication in human life.

“Speaking is the productive oral skill which consists of producing systematic verbal utterance to convey meaning. It is the most common and important means of providing communication among human beings. The key to successful communication is speaking nicely, efficiently and articulately, as well as using effective voice projection, speaking is linked to success in life, as it occupies an important position both individually and socially” (Ulas: 2008).

Eventhough there are other skills to be learned in language such as reading, writing and listening, which are also important, speaking skill plays dominant role than the others. Everything we have in mind however cannot directly be shared without oral communication at the moment. For this reason, stimulating the L2 learners to ‘speak up their minds’ in various ways should be implemented to make them used to do it.

Brown categorized the five types of speaking with the taxonomy emerged for oral production. The first stage is *imitative*, which is defined as “the ability to simply parrot back” (Brown: 2003) or imitate. It has no inferences on understanding or conveying meaning to be able to participate in conversation. The second is *intensive*, “the ability to produce the short stretch of oral language designed to demonstrate the competence in a narrow band of grammatical, phrasal, lexical, or phonological relationships in order to be able to respond, but still minimal in interacting the interlocuter” (Ibid: 2003).

The third stage is *responsive* which “includes interaction and test comprehension, but still in very short conversation, standard greetings and small talk, simple request and comments, etc” (Ibid: 2003). While the fourth is *interactive* which is the same with the responsive but differ in the length and complexity of the interaction, “including more participants and aimed at having transactional and interpesonal interactions” (Ibid:

2003). The last stage is *extensive* that “includes speech, oral presentation, and story telling” (Ibid: 2003). In this stage, the language style is frequently more deliberative and formal. This is the the highest stage in speaking taxonomy which is necessary for EFL learner, especially for undergraduate students in English major.

Even though previously people commonly think of academic writing with its complexity when it comes to speaking about academic discourse, Hyland argued that oral presentation is also the important aspect in academic discourse that needs high language competence, as he stated:

“Although we tend to think of academic discourse in terms of print texts, the ability to comprehend, and perhaps produce texts which are written to be spoken, such as lectures, conference papers and class presentations, or to navigate a way through interactive encounters like seminars, supervisions, and dissertation defences, involves no small degree of specialist language competence” (Hyland: 2009).

Therefore, oral presentation, especially in the academic context is also essential for the knowledge sharing itself since nowadays those encounters are quite a trend among the academic community.

2.3. Theoretical Framework

This study focuses on the analysis of hedging devices in student’s oral presentation that adopts the contextual analysis in which the lexical forms that are considered as hedges were also analyzed based on the context. That is why the analysis of the study was both in formal and functional analysis which implies that some lexical forms that are usually considered as hedges might not be counted as hedging devices when it is used not to carry the hedging function in its utterance.

Of all the theories of hedging discussed above, the basic theory underlying this study refers to Meyer's study of hedging in which the hedging devices were analyzed in formal and functional criteria. The reliability of such analysis might not be fully assured but Meyer believed that "it is much better than a "blind" identification such as analyzing on purely formal and non functional one which she claimed could lead to the distortion of the data" (Meyer: 1994). In addition, this analysis criteria was also adopted for it is suitable and more reliable for academic discourse rather than other kinds of hedging criteria generally and had been used in some academic researches.

The analysis of this study was based on the following hedging criteria. There are five classifications of hedging devices which comprises the formal and functional analysis according to Meyer (1994) as follows:

- 1) Shields: all modal verbs expressing possibility semi-auxiliaries (*to appear, to seem*); probability adverbs (*probably, likely*) and their derivative adjectives; epistemic verbs which relate to the probability of a proposition or a hypothesis being true (*to suggest, to speculate*).
- 2) Approximators: stereotyped *adaptors* as well as *rounders* of quantity, degree, frequency and time (*approximately, roughly, somewhat, quite, often, occasionally*) which express heed and coyness, when exact figures are irrelevant or unavailable or when the state of knowledge does not allow the scientists to be more precise.
- 3) Authors'/speaker's personal doubt and direct involvement (*I believe, to our knowledge, it is our view that*)

- 4) Emotionally-charged intensifiers, comment words used to project the authors'/speaker's reactions (*extremely difficult/interesting, dishearteningly weak, of particular importance, particularly encouraging, unexpectedly, surprisingly*)
- 5) Compound hedges, which comprised strings of hedges or juxtaposition of several hedges, can be in the following forms:
 - a. double hedges (*It may suggest that... ; it could be suggested that...*)
 - b. treble hedges (*It would seem likely that ..., it seems reasonable to assume*)
 - c. quadruple hedges (*It would seem somewhat unlikely that ...*)

(Meyer: 1994)

To help ensuring some forms that were doubtful to be counted as hedges, the simple 'test of hedges' proposed by Crompton (1997) was adopted to determine whether or not the utterances are hedged when necessary. The test consists of the following questions:

“Can the proposition be restated in such a way that it is not changed but that the author's (or speaker's) commitment to it is greater than at present? If 'yes' then the proposition is hedged” (Crompton:1997)

Thus, how the hedging devices occur as well as their use and impacts in the utterances are discussed based on the theories of hedging by some researchers which are also previously described in this chapter.