

## CHAPTER ONE

### 1. INTRODUCTION

*"Would you rather be Einstein or Shakespeare? I'm not sure whose genius is the more awesome. I come, hesitantly, to believe we need both science and story to make sense of the universe"*

*Stuart Kauffman, 2000*

South African Airways, the standard bearer of our country, experienced turbulent times in the past decade. Despite financial losses, fierce competition and low staff morale, the airline managed to record a profit of 349 million for the fiscal year 2000. Presently, the company attempts to reposition itself as a world class airline by streamlining management and unlocking expertise. New aircraft have been acquired and recently a staggering amount of R600 million has been spent on upgrading interiors, lounges, uniforms and facilities. One wonders, however, whether the same amount of attention and care is being lavished on the 2 400 cabin attendants' physical and psychological well being.

#### 1.1 MOTIVATION FOR THIS STUDY

In the Sunday Times newspaper (March 22, 1998, p. 12) a report with the following title was published: *"SAA's rude cabin crew on flights from hell"*. The report is a summary of a nine-page document, which listed passengers' complaints about aggressive cabin attendants. According to this report, rude and inefficient cabin staff was chasing domestic and international customers into the seats of opposition airlines. The following two quotes are verbatim examples of some of the complaints:

## COMPLAINT 1

“I have severe arthritis and battled to get up the stairs to the upper deck. When it was time to disembark, I asked the airhostess to help carry my hand luggage (one small case) down the stairs. She rudely asked why I could not do it myself! On my return flight, when I asked the steward for a refill of Scotch, his reply was: ‘What – another one?’ “

## COMPLAINT 2

“Some of your crew were downright rude. Passenger X got sick during the night due to the turbulence and had to vomit. She tried to get to the toilets but found them occupied. The staff saw that X had a problem, but didn’t help her find an empty toilet. Again, X vomited, this time on the floor in front of the galley. Instead of taking care of a sick person and helping her, your crew instructed Mrs. X to clean the floor by herself using two plates!”.

According to the aforementioned article, SAA suffered a loss of R58-million in December 1997, and cannot afford to lose a single passenger. Competition in the airline industry is growing fiercer. In the Business Day of 11 September, 2001, it was reported that the planned listing of SAA on the stock exchange will be postponed for at least two years, because of its uncertain financial state and weak market conditions for international carriers. To stay competitive within this market, SAA needs to improve its customer services. Frustrated and aggressive cabin crew cannot render the world-class service that SAA claims to offer to its passengers.

In South Africa, previous research concerning the impact of work schedules on cabin attendants' physical and psychological health is limited to one study. Pamela Ann Porter (1988) did exploratory research on work schedule stress as experienced by female flight attendants on SAA's domestic routes. By means of unstructured interviews and a self-descriptive questionnaire, Porter investigated the nature of work schedule stress and its' relationship to the various aspects of health of female cabin attendants. Porter (1988, p.138) suggested: "... while the themes raised as requiring attention in the more theoretical arena may be of relevance and importance, a far greater need lies with the SAA to engage in practical research, geared towards explaining the realities and problems experienced by the employees and means of resolving such". From the results of the aforementioned study it was clear that the prime responsibility for ensuring an individual's wellness lies with that individual him/herself. However, if the efforts of

cabin attendants to improve their quality of life are not supported by company policies all their efforts will be futile.

Inadequate research done in this field, as well as an avid personal interest in the airline industry, served as motivation for me to explore this virgin territory.

The remainder of this chapter provides a brief overview of the study. To conclude, Bateson's (1972) famous phrase "*the pattern that connects*", is presented as an introduction to systems thinking.

## **1.2 OVERVIEW OF THE STUDY**

In Chapter 2, the systems theoretical approach is presented as the framework of this study. The meaning of the term epistemology - and, more specifically, systemic epistemology - is discussed in detail. Fundamental systemic principles as they pertain to the study are reviewed. The chapter is concluded with a description of the researcher as part of a self-referential system.

Chapter 3 is a review of the research context and the existing literature on environmental stress. The dimensions of environmental stressors that have relevance to this study are briefly discussed. The physiological response of the body to stress is described in detail. Two complementing models, both depicting the physiological processes involved during the stress response, are presented. The chapter is concluded with a brief discussion of work schedule stress and the discipline of chronobiology.

The research process is comprehensively described in Chapter 4. A motivation for the use of interviews as a research method is given. Consequently, a seven-stage model of interview research is introduced. The three levels of qualitative analysis that were conducted, as well as the systemic rationale underlying this multilevel methodology, are discussed.

In chapter 5 the results and discussion of the first-level analysis are presented. The first-level analysis comprises individual descriptions of experiences, which are coded into categories according to well-defined criteria. These categories are discussed on the basis of selected quotes from respondents.

Chapter 6 presents the second- and third- levels analysis. The second-level analysis comprises the identification of relations between experiences. Specific coding categories are combined together, constituting a specific pattern category. The third-level analysis entails an integrated conceptual discussion indicating how the coding and pattern categories are related to the more general concepts of the systems theory.

In chapter 7, the final conclusions and recommendations are presented.

### 1.3 "THE PATTERN WHICH CONNECTS ..."

*"What pattern connects the crab to the lobster and the orchid to the primrose and all four of them to me? And to you?"*

*Gregory Bateson*

In the first chapter of his book "Mind and Nature", Bateson (1972, p.16) asked the following question:

"Why do schools teach almost nothing of the pattern which connects? Is it that teachers know that they carry the kiss of death which will turn to tastelessness whatever they touch and therefore they are wisely unwilling to touch or teach anything of real-life importance? Or is it that they carry the kiss of death *because* they dare not teach anything of real-life importance? What is wrong with them?"

What Bateson is communicating to the reader is the ignorance or insensitivity of modern man towards the interdependency of all living creatures. We tend to divide the perceived world into separate objects that we see as firm and permanent, but which are really transient and ever-changing. Official education taught me nothing about the indivisibility of all life, about relationship, pattern, partnership, and interdependency of all living things. Instead, I was taught everything about independence, linear cause-and-effects, competition and the disconnectedness of things. It was my parents, who during family hiking trips, made me aware of the deeper truth that, in nature, there is a pattern which connects all living things to one another. At this very

basic level, my parents' teachings were my first contact with *systems thinking*, which formed the theoretical framework for this study. This awareness challenged me to be more mindful of some of the hidden effects of my own perceptions and actions on personal relationships as well as the natural environment, because there *is a pattern that connects*. In this study, I will attempt to identify the connecting patterns in the life experiences of flight attendants at South African Airways.

In the following chapter, certain fundamental systemic principles will be described. These principles are the patterns that connect different living systems to one another. It will be illustrated why these principles can successfully be applied to an understanding of the functioning of all living organisms, i.e. from humans in various contexts to ecosystems in nature.

## CHAPTER 2

### PRINCIPLES OF THE SYSTEMS THEORETICAL APPROACH

#### 2.1 INTRODUCTION

The aim of this chapter is to provide the theoretical background from which this study was undertaken. Firstly, a motivation for the choice of a systemic approach is presented. Secondly, the term *epistemology* is defined. Furthermore, certain systemic principles are discussed as they pertain to this study. In conclusion, the importance of taking into account the position of the researcher is pointed out.

#### 2.2 MOTIVATION FOR USING A SYSTEMIC APPROACH

*"We need a psychology which allows its practitioners to, metaphorically spoken, keep themselves busy with the study of "Mother Earth" (that is the total human being in all the contexts of his/her existence) and not only with the colour and condition of her finger nails, that is the fragmented facts, and mostly trivial elements of human functioning."*

*Jordaan & Jordaan (1984)*

The aim of this study is to provide a comprehensive description of the person-environment transaction. An approach is needed that will include the whole phenomenon. Any particularistic, context-free effort to study human behaviour patterns will, because of the complexities involved, lead to a limited understanding of the complete context. According to Wapner (1987) the researcher may gain much broader insight when studying the environment and the person in the environment from a holistic perspective, since such a perspective acknowledges the fact that "every person is always inextricably embedded in some environment, that is, in some physical, chemical, biological, interpersonal, socio-cultural context" (p.1440).

A systems theoretical perspective meets the requirements of such an approach. The focus is on the underlying *processes and patterns* of human behaviour. Bateson (1973, p.31) emphasised that: "mental process, ideas, communication, organisation, differentiation, pattern and so on, are matters of form rather than substance." In other words, an adequate description of mental

processes, ideas, communication, etc. requires an account of the relationships *among* objects and events, and not just of the objects of events themselves. A sequence of actions over time, and not the individual action, creates a pattern. It is this *pattern of actions* in human behaviour that the researcher is seeking to uncover and reveal. Bateson (1979) was of the opinion that it is this dynamic patterning of phenomena that distinguishes the living (creatura) from the non-living (pleroma).

The value of this approach lies therein that it endeavours to provide a contextual framework within which the *extent, complexity and interdependency* of human functioning may be studied. In its totality, the environmental context forms what Keeney (1984) named "a unitary interactive system." Each transaction between individuals, or between individuals and their environment, forms a linkage in a intricate network of interconnections. Viewed over time, month by month, this network of transactions establishes a dynamic equilibrium as every individual strives to adapt to changing social and environmental conditions. According to Kerzer (1989) a systemic epistemology allows the researcher to take into account all the interrelationships between the structures and their meanings.

Because the person-environment transaction that forms the subject of this dissertation is complex and multidimensional, its study demands a theoretical framework that is able to accommodate complexity and multidimensionality. The systemic approach assumes a broader context in which relationships, patterns of relationships, patterns of patterns of relationships, etc. are taken into consideration. Hence, it was decided that systems theory is the paradigm of choice for this study.

Systems theory not only urges the researcher to take into account the complex interrelationships that may obtain between phenomena; it also points out the inevitability of complex interrelationships between the *observer* and that, which is being observed. If it is true that a part cannot be understood in isolation from the whole (since part and whole exert a reciprocal influence on each other), it follows that the *process of knowing or describing* cannot be understood in isolation from the larger psychological, socio-cultural and ecological matrix in which it is embedded.

Keeney (1983, p.3) emphasised that "any position, perspective, conceptual frame of reference, or idea is a partial embodiment of a whole we can never completely grasp." Bateson (1970, p.100) stated: "I surrender to the belief that my knowing is a small part of a wider integrated knowing that knits the entire biosphere or creation".

Many scientific theories have erred by assuming that complete objectivity is possible - in other words, by assuming that the scientist can "jump out of the system" so as to escape the assumptions or premises that necessarily guide and constrain all knowing and theorising. As a result, scientists with divergent sets of assumptions have often constructed very different theories to describe and explain observed phenomena. Because they were ignorant of the extent to which their theories reflected their own intellectual biases, each claimed special access to "objective reality" and, by implication, consigned rival theories to the realm of illusion. In psychology in particular, this approach to science gave rise to the disputes between the psychoanalysts and the behaviourists, the humanists and the determinists, etc. that have marked much of the history of this science.

As Fiedeldey (1991, p.102) pointed out, psychology is in need of a *meta-theoretical approach* that is able to deliver it from this intellectual impasse: "What is now required, is to make a move away from the development of more theories at the same level of abstraction as those already in existence, to a level which will enable conceptualisations that will explicitly include the assumptions that form part of the process that occurs during theory development."

Fiedeldey (1991, p.103) emphasised that the difference between a theory and a meta-theoretical approach is that "whereas a theory provides a framework for observation, description and analysis, a meta-theoretical approach also considers the principles which lead to any particular observation, description and analysis." Systems theory is an example of such a meta-theoretical approach, since it explicitly includes the processes of observation, description and analysis within the scope of that which is being observed, described and analysed. As such, it holds the promise of being a significant unifying force among the various rival theories in psychology.

To summarise: As was discussed above, systems theory is geared towards the description and analysis of complex networks of interrelationships. Since the experiences and perceptions of SAA cabin crew form part of such a complex network, systems theory is an appropriate conceptual framework for this study. However, systems theory also cautions that such a study is



likely to be successful only if the researcher makes her own assumptions explicit and extends the scope of the study to include her own process of knowing. In other words, it states that scientific research, in order to be truly scientific, must be an *epistemological* enterprise. Consequently, the theoretical discussion below will begin with a definition and explanation of the term *epistemology*.

## 2.3 DEFINITION OF EPISTEMOLOGY

*“We draw distinctions, that is, we pull them out. Those distinctions that remain undrawn are not.”*  
*Bateson (1980, p.107)*

Epistemology refers to the study of how a person understands the world. As a science, epistemology is that branch of philosophy that attempts to answer the following questions:

What *is* knowledge?

*How* do we know what we know?

What *can* be known and what *cannot* be known?

Keeney (1983, p.13) defined the concept as: “... the basic premises underlying action and cognition”. What a person knows cannot be separated from how a person knows. Gouws, Louw, Meyer and Plug (1982) defined epistemology as the study of the origin, nature and boundaries of knowledge. Bateson (1979, p.228) defined **epistemology** as “how particular organisms or aggregates of organisms know, think and decide”. Keeney (1983, p.13) summarised this definition: “...epistemology becomes a study of how people or systems of people know things and how they think they know things. The study of epistemology, in more general terms, becomes a way of recognising how people come to construct and maintain their habits of cognition”.

According to Keeney (1983, p.18) “the most basic act of epistemology is the creation of a difference. It is only by distinguishing one pattern from another that we are able to know our world”. The observer first distinguishes and then describes a pattern. When an observer describes a pattern that has been distinguished, this description is itself the drawing of a distinction:

“We draw distinctions in order to observe and subsequently, we draw distinctions in order to describe what we observe. The recursive operation of drawing distinctions upon distinctions again points toward the world of cybernetics where action and perception, prescription and description, and construction and representation are intertwined” (Keeney, 1983. p.24).

A systemic epistemology enables an observer to describe multiple versions of reality, recursively. Seemingly divergent approaches can be combined to obtain a more holistic view of phenomena. Bateson (1979, p.146) uses binocular vision as a metaphor for explaining double description:

“...two eyes, each giving a monocular view of what goes on and, together, giving a binocular view in depth”. This recursive nature of systems theory enables the observer to get a higher-order perspective. Keeney (1983) uses the example of ‘play’ which is a higher-order distinction of a simple action, ‘throwing a ball’ (a lower order distinction):

“To move from one order of description to another within this system of analysing experience requires an act of double description: That is, a view from each side of a relationship must be juxtaposed to generate a sense of the relationship as a whole” (Keeney, 1983, p.41).

Through double description, that is the process of drawing distinctions upon distinctions, the researcher transcends the dualities of the Cartesian-Newtonian approach. The latter approach. is reductionistic and does not take the interrelationships between elements into account. One approach may be seen as a higher order of another. Any epistemology is only a description of reality as observed through the eyes of a specific observer, and other observers who share the same truth. “Truth is impermanent, it exists only within the pattern which generated it, and ‘runs out’ when the pattern is transformed or disintegrates” (Auerswald, 1992, p.28).

Systems theory points out that it is important for a researcher to be aware of his/her own frame of reference, which is the conceptual grid or filter through which observations are initially enabled and consequently interpreted. This will lead to a deeper understanding of his/her own thoughts, perceptions and experiences and how they may affect the research process.

Certain fundamental systemic principles underlying the way of thinking in this study will consequently be discussed.

## **2.4 FUNDAMENTAL SYSTEMIC PRINCIPLES**

### **2.4.1 System**

*“Unless you confront the mutualness, the closure of a system, you just lose the system. It is the simultaneity of interactions that gives whole systems the flavour of being what they are”.*

*Varela (1976, p.27)*

According to Schwartz (1997, p.26) “... a **system** is seen as a non-separable entity constituted of objects (components) in relations (interaction)”. Schwartz (1997, p.30) stated further: “Systems are comprised of a unified pattern of events, and their existence, as well as their character are derived more from the nature of their organisation, than from the nature of their components”. Two or more components in dynamic interaction comprise one emerging whole. In short, a system is a patterned organised whole of interacting components. As a pattern of organisation, any addition or subtraction alters the character of a system. Components of a system can be distinguished from each other, although functionally they cannot be separated. Functional organisation of a system refers to the inherent structure, that is the relation or connections, which exists simultaneously between these components within the system. A system always function according to it’s own internal structure or organisation. It is the coherence of the components, the unique structure, which determines the identity of a system.

Living systems are integrated wholes whose properties cannot be reduced to those of smaller parts. In this regard Capra (1997, p.36) stated:

“Systemic properties are properties of the whole, which none of the parts have. They arise from the ordered relationships that is characteristic of that particular class of organisms, or systems. Systemic properties are destroyed when a system is dissected into isolated elements”.

Bateson (1979) and Keeney (1983) emphasised that the identification of a system lies with the observer and that objective systems do not exist in themselves. According to Fiedeldej (1991, p.105) “...the researcher has the choice of arbitrarily drawing the lines or boundaries by which he or she conceptualises the system”. However, as Bateson (1972, p.459) stated, the drawing of boundaries is not completely arbitrarily: “The way to delineate the system is to draw the limiting line in such a way that you do not cut any of these pathways in ways which leave things inexplicable”. It is therefore clear that the researcher has the choice to draw the boundaries of the system, although some limiting lines might be better than others. In this study the person-in-environment system is the unit to be analysed (Wapner, 1987). In order to be more specific, the physiological -, cognitive- emotive-, perceptual- and socio-cultural subsystems are demarcated as the focus of analysis.

#### **2.4.2 Subsystem**

*Mental process is always a sequence of interactions between parts. The explanation of mental phenomena must always reside in the organisation and interaction of multiple parts”.*

*Bateson (1979)*

The universe is understood as a hierarchy of systems, where each higher level of system is composed of systems at lower levels. The individual is a system, consisting out of several interacting subsystems, and on a different level is also a subsystem of a greater system, the organisation. An increasingly inclusive line of systemic integration implies an unlimited potential for a theoretical holism. In reality, interaction does not occur in such a hierarchic line, but can occur directly between an individual and a socio-cultural system. Keeney and Sprenkle (1982, p.10) described the interconnectedness and recursiveness of subsystems as follows: “It is like a set of self-organising Chinese boxes, each one neatly fashioned to fit inside the other, ad infinitum”. A living system is part of a system is part of a system is part of a system...

For the purpose of this dissertation two fundamental subsystems were distinguished namely, the *interpsychic subsystem* and the *intrapsychic subsystem*. It should be emphasised that these two subsystems are not on the same level of abstraction. In the same way that the tree is a subsystem of the wood, the intrapsychic system is a subsystem of the interpsychic system.

#### 2.4.2.1 The interpsychic system

The *interpsychic* system refers to the socio-cultural context within which an individual functions. This is the external environment where information exchange/transaction occurs through language between people. Maturana (1987) identified language as the critical phenomenon in the development of social and cultural unity. It is known that the cohesion of insect communities is based on the exchange of chemicals between them, while social unity of human communities is based on the exchange of language. Humans are inseparably bound to each other and the world through language (Keeney, 1983). Although their realities differ, humans share what Capra (1987, p.322) named collective consciousness - that is, shared patterns: "As individuals we participate in these collective mental patterns, are influenced by them, and shape them in turn". These shared patterns of consciousness, contribute to the meaning that humans give to their perceptions and experiences of the environment.

#### 2.4.2.2 The intrapsychic system

The *intrapsychic* subsystems represent the innermost being, the internal environment of an individual and constitute the perceptual-, cognitive- and emotive subsystems. The physiological subsystem is part of this system, although on a lower level of abstraction. The difference between these levels is similar to the difference between a mind and a brain. The aforementioned subsystems are *interdependent* and constitute the unique range of experience of an individual. Jordaan & Jordaan (1989, p.42) describe intrapsychic subsystems as the differentiation of consciousness, that is an individual's "ability of self-awareness, the ability to perceive, think, learn, remember and feel, to have motives and a self-image which is relevant to certain actions and patterns of actions".

### The perceptual subsystem

The process of perception involves the receiving and processing of information. According to Bateson (1979, p.37) all perceptions are transformations: “In all thought or perception or communication about perception, there is a transformation, a coding between the report and the thing reported, the Ding an sich”. The perceiving individual uses a method of questioning based on his/her own epistemology, to create the perceived image. This implies that different people can perceive the same experience differently, because they punctuate reality differently. The perceiver's epistemology will determine which distinctions will be drawn and which will not be drawn. The experiences of an individual become meaningful through his/her unique cognitive interpretation.

### The cognitive subsystem

The neo-cortex is the part of the brain where cognitive activities take place. Plug *et al.* (1989) defined cognition as all the processes through which an organism attains knowledge about an object, or become aware of the environment. These processes include perception, recognition, imagination, evaluation, memorising, learning and thinking. Knowledge gained is only a description of reality, and not reality in itself. Korzybski cited in Bateson (1979, p. 37) stated:

*“The map is not the territory”*. Cognition is merely representations of reality, and not reality in itself – “and is therefore limited by the generalisations that its receipt of information will never prove anything about the world or about itself” (Bateson, 1979, p.142).

Cognitive abilities free a person from the control that current events can have on one's life: “They enable people to conceive of objects, entities, environments, and events that have never existed and to combine such conceptions with memories of the past, expectations of the future, and current perceptions to guide actions that actually create imagined future possibilities” (Ford & Lerner, 1992, p.117).

### The emotive subsystem

The emotional centre of the brain originated in the brainstem (Goleman, 1996). That implies that there was a feeling brain long before there was a thinking brain, which explains erratic and irrational behaviour. According to Goleman (1996) neuroscientists associate emotions with the limbic system in the brain. The limbic system is enriched with peptides, which are according to Capra (1997) the biochemical manifestation of emotions: “The entire group of 60-70 peptides

may constitute a universal biochemical language of emotions.” Peptides create a psychosomatic network by mediating emotional states. This intricate network of peptides integrates the cognitive-, physiological- and emotive subsystems. This implies that all experiences and perceptions are coloured by emotions.

The emotive subsystem involves the experience of feelings, and is directed at a holistic experience of the environment. In this regard, Bateson (1979, p.38) remarked:

“The distinction between the name and the thing named or the map and the territory is perhaps really made only by the dominant hemisphere of the brain. The symbolic and affective hemisphere is probably unable to distinguish name from the thing named. It is certainly not concerned with this sort of distinction. It therefore happens that certain non rational types of behaviour are necessarily present in human life.”

## 2.5 CYBERNETICS

*“When we consider the extreme instability of our bodily structure, its readiness for disturbance by the slightest application of external forces and the rapid onset of its decomposition as soon as favouring circumstances are withdrawn, its persistence through many decades seems miraculous. The wonder increases when we realise that the system is open, engaging in free exchange with the outer world, and that the structure itself is not permanent but is being continuously broken down by the wear and tear of action, and as continuously built up again by processes of repair”.*

*Cannon, 1932*

The aim of this section is firstly to give a definition of cybernetics. Secondly, a description of the basic cybernetic concepts of positive and negative feedback will be given. Thirdly, second order cybernetics will be discussed in terms of the self as an observing system.

### 2.5.1 Definition

**Cybernetics** is the science that studies mechanisms of self-regulation in machines and living organisms. According to Capra (1997) Norbert Wiener invented the word, which is derived from the Greek word *kybernetes* and means ‘steersman’. Wiener (in Capra, 1997, p.51) defined **cybernetics** as “the science of control and communication in the animal and the machine”. It

was during the Second World War that Wiener and Ashby recognised the profound similarity between mechanical feedback loops and the dynamics of many biological and psychological processes (Perold, 2000). This definition postulates a resemblance between some aspects of people's behaviour and the behaviour of machines, but it does not imply a mechanistic view of humanity. Human behaviour, thoughts and feelings are much too complex to be reduced to the laws of mechanics. However, it is possible to identify feedback loops, i.e. circular chains of cause-and-effect in human behaviour. These cybernetic loops come in two basic varieties and will consequently be discussed.

### **2.5.2 Negative feedback loops**

*"To become accustomed to anything is a terrible thing".*

*Japanese Zen Master (in Bateson, 1972)*

*Negative feedback loops* (also referred to as homeostatic feedback loops) operate to maintain the stability of a system. They correct deviations from the preferred state by instigating some contrary or compensatory action and therefore manifest themselves as oscillating variables. Certain variables in a system must vary to counteract the effects of unpredictable changes in the environment, thereby keeping critical variables within their limits of tolerance (see Chapter 2). An example of a negative feedback loop in the lives of cabin crew would be the isolation that crew attendants seek after a long flight with demanding passengers. A cabin attendant may want to withdraw from people to regain his/her emotional balance. After some time of peace and quiet the cabin attendant feels refreshed and ready to serve the next bunch of passengers.

### **2.5.3 Positive feedback loops**

*Positive feedback loops* facilitates exponential change in a system by reinforcing deviations instead of compensating for them. A positive feedback loop is established when external fluctuations from the preferred state are amplified. An example of such a self-amplifying feedback loop in the airline industry would be the relationship between customer service and letters of appreciation that cabin attendants receive from passengers. Hard working cabin attendants receive letters of appreciation from passengers, which increase their motivation, causing them to render better customer service. The same positive feedback loop can also have a "snowball effect" in the opposite direction: cabin attendants rendering poor customer service,



receive complaints from angry passengers, causing them to react more aggressively towards dissatisfied passengers.

A *positive feedback loop* is not always "positive" in the sense of "being good". Both positive and negative feedback loops can be constructive or destructive.

#### **2.5.4 Adaptability**

The difference between living systems and mechanical systems is that most living systems are governed by multiple feedback loops. An interplay of negative and positive feedback loops, of stability and change, characterise healthy adaptation to changing environments.

Bateson (1972, p.17) suggested that "all change can be understood as the effort to maintain some constancy and all constancy as maintained through change". This implies that a variety, or in Batesonian terms, an ecology of behaviour patterns is necessary for successful adaptation. According to Stokols (1978) optimisation is the cyclical feedback process whereby people seek optimal environments for themselves. Optimal environments are those that maximise fulfilment meet needs or support the accomplishment of goals the individual has. O. Connor and Lubin (1990, p.46) stated:

"Not only do individuals adapt or cope with their milieu, but they also arrange or modify it to better suit themselves. In optimisation, humans actively orient to, operate on, and evaluate the quality and conduciveness of the environment as a context for future goals and activity".

Bateson (1972, p.381) remarked: "*Corrective action is brought about by difference*". This notion implies that flexibility and diversity of behaviour patterns is critical for the optimisation of the person-environment fit. With regards to friends, it is possibly easier for cabin crew to stick to SAA friends, particularly due to work schedule related problems, which make it difficult to maintain meaningful outside friendships. In this way, the system can get stuck in a series of positive feedback loops, which is destructive. It is therefore necessary that crew attendants spend time with people or organisations outside the airline system, which offer a stabilising effect, a negative loop in the whole system.

### 2.5.5 Flexibility: "the uncommitted potentiality for change"

Bateson (1972) used the phrase "an uncommitted potentiality for change" to define flexibility and rephrased the concept of stress as a loss of flexibility. If a system's capacity for change is large enough, reactions to stress will have adaptive value to the system. The uncommitted potentiality for change ensures that the system has the freedom to cope with and adapt to unpredictable changes in the environment. For any system to be healthy, whether it is health in a psychological, physiological or an organisational system, the wise expenditure of flexibility is a necessity.

Health in any system refers to a vital balance of diverse forms of experience and behaviour (O'Connor & Lubin, 1984). Stability arises in the way these experiences or behaviour sequences are patterned. Bateson (1972) compared a healthy system to that of an acrobat on a tightrope. The acrobat has to have the flexibility to be able move his arms freely, to keep a more basic variable (his position on the rope) constant. The angle that the acrobat's body makes with the vertical line of the floor is the critical variable that needs to stay within certain limits of tolerance. Within these limits, the acrobat moves to achieve balance or adaptation. If the acrobat moves too far to either side of the rope and this corner become too large, the limits of tolerance will be exceeded and he will fall. The moment the acrobat's arms are fixed or paralysed, he loses his flexibility and the slightest vibration of the rope will throw the acrobat off balance. Additional variables such as a sudden gust will disturb the acrobat's equilibrium.

Consider for example "*social relatedness*" as the critical variable - that is, the awareness of being connected to other individuals. A system needs the proper functioning of a negative feedback loop to keep the critical variable within safe limits of tolerance. The critical variable can exceed either its lower limit (social isolation) or upper limit (social suffocation) of tolerance. If a cabin attendant experiences feelings of intense loneliness (the critical variable moves too close to the lower limit of tolerance) he/she might look for the company of other people. Social interaction will heighten the critical variable to more comfortable levels of tolerance. If a cabin attendant experience feelings of social "suffocation" or claustrophobia (the critical variable moves too close to the upper level of tolerance), the cabin attendant might withdraw from people to gain some personal space and privacy. Withdrawal will lower the critical variable "social relatedness" to more comfortable levels of tolerance.

It seems that this negative feedback loop cannot function efficiently in the working environment of cabin attendants. They are often bereft from their flexibility with regards to social interaction. They do not always have the flexibility (freedom) to choose with whom they want to spend their time, especially during a 17 hour flight: *"I want to be with people that I choose, not just with anyone that is available"* (Porter, 1988, p.97). Like Bateson's acrobat, cabin attendant's arms are paralysed or tied behind their backs. Additional socio-cultural stressors can exacerbate this situation.

#### 2.5.5.1 "A budget of flexibility"

A budget of flexibility in any system can be compared to a financial budget. There is only a limited amount of money available that needs to be budgeted carefully to cover the necessary expenditures. If unnecessary money is spent on movies, there will be less money available in the budget for the monthly groceries. Any surplus of money may serve as an emergency fund when money is suddenly needed for unexpected circumstances. In the same way, the budget of flexibility available to an individual is limited. In any system, flexibility should be applied to areas where it is most beneficial. In the case of stressed out cabin attendants, the budget of flexibility seems to be depleted. Using the analogy of Bateson's acrobat, the following question arises: What "paralyses the arms" of cabin crew and causes them to become rigid? In other words, why do cabin attendants experience a loss of flexibility? It seems that the effects of the rapid environmental change and the stressors accompanying it require so much adaptation or flexibility that there is not much left to be used for activities geared towards enhancing health, wellbeing and creativity. Instead of using whatever flexibility is available for health enhancing activities, it is used for regressive coping skills. This means that too much energy is recklessly spent on health impairing behaviour, for example negative thoughts, a sedentary lifestyle and substance abuse. In this regard, Bateson (1972, p.505) remarked: "Social flexibility is a resource as precious as oil or titanium and must be budgeted in appropriate ways, to be spent (like fat) upon needed change".

Loss of flexibility in one system has the propensity to diffuse to other systems, because systems are interdependent. Change in one system always permeates to another system. It can be stated that some cabin attendants experience a loss of flexibility in their working environment, which leads to a loss of flexibility in their personal lives. In the same way, the physiological wellbeing of an individual invariably reflects the psychological wellbeing of the same individual.

## 2.6 SECOND ORDER CYBERNETICS

At the beginning of this chapter, the importance of scientific research as an *epistemological enterprise* was emphasised. Schwartz (1997, p.22) remarked: “In second order cybernetics the system, an individual or a group, is defined as having the ability to reflect on its own operations on the environment and even on it self “. Therefore, second order cybernetics, involves the study of feedback loops within feedback loops. While cybernetics refers to observed systems, second order cybernetics refers to, as Von Foerster (in Schwartz, 1997, p.22) remarked: “the cybernetics of observing systems”. This notion was acknowledged by Bateson as a paradigmatic advance. There is no objectivity in perceptions and experiences, because the perceiver is always part of the observing system. It was from the concept of second order cybernetics that the awareness of the importance of an epistemological approach in science developed. In this chapter, the epistemological circle is completed through a description of second order cybernetics.

### 2.6.1 Construction of reality

Maturana (1980, p.51) uses the analogy of the pilot who makes a blind landing to explain subjectivity in an observer’s construction of reality:

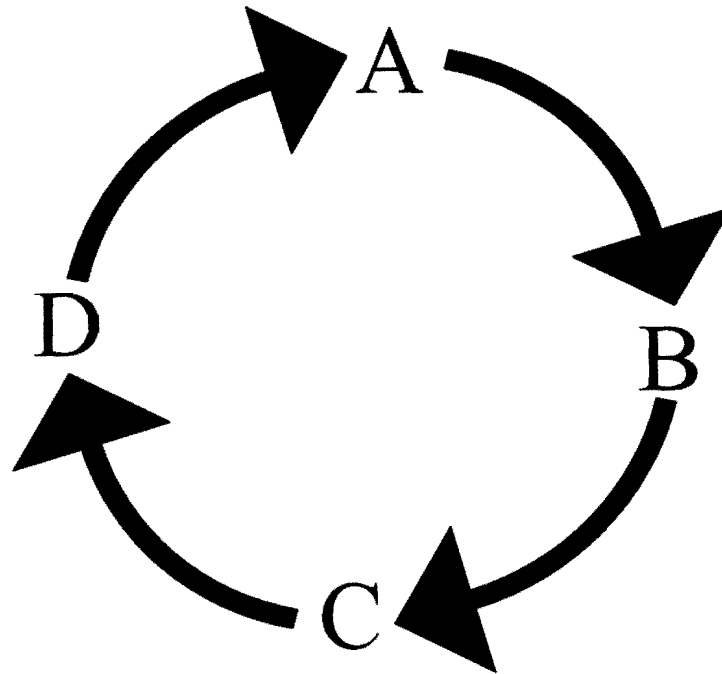
“ What occurs in a living system is analogous to what occurs in an instrument flight where the pilot does not have visual access to the outside world and must function only as a controller of the values shown in his flight instruments ... When the pilot steps out of the plane he is bewildered by the congratulations of his friends on account of the perfect flight and landing that he performed in absolute darkness. He is perplexed because to his knowledge all that he did at any moment was to maintain the readings of his instruments within certain specified limits, a task which is in no way represented by the description that his friends (observers) make of his conduct.”

Maturana implies that humans are always making blind landings, although we are exchanging information with the outside world all the time. As humans, we can only create a map of the territory and generate trajectories, invisible to us. The connections of our trajectories show up on our instrument panel, which is our subjective reality. Bateson (1970, p.38) stated that all experience is subjective: “...our brains make the images that we think we ‘perceive’”. In this

sense, one can speak of an observing system, which is formed by the observer and that which is observed. To study whole systems, one must approach their self-reference.

### 2.6.2 The self as an observing system

The organisation of whole systems is circular. Every subsystem interacts with every other subsystem, and any perturbation of one subsystem, will eventually affect the whole system. This circular organisation can be explained by the following example:



Initially, every subsystem interacts with every other subsystem, that is A with B, B with C, and C with D. Then, on a different level the interactions of the interactions can be described: A's interaction with B interacting with B's interaction with C interacting with C's interaction with D etc. This is where the complete circuit interacts with itself and becomes a self-referential system. In this respect Du Toit (1995) emphasised that the focus and outcome of research are determined to a great extent by the perspective, culture and background of the researcher. The researcher is recursively part of the researching system, his or her questions and hypotheses create the reality of the phenomenon being studied (Keeney, 1983).

### 2.6.2.1 “Vincent’s room in Arles, 1889”

*“As human beings, we shape our environment very effectively because we are able to represent the outer world symbolically, to think conceptually, and to communicate our symbols, concepts, and ideas. We do so with the help of abstract language, but also non verbally through paintings, music and other forms of art”.* (Capra, 1987, p.321)

Any description of a perceived reality is self-referential. The patterns that a person observes around him/her are fundamentally based upon the patterns within the self. In this regard (Capra, 1987, p.320) stated: “Patterns of matter mirror patterns of mind, coloured by subjective feelings and values”. Self-reference is the pattern that connects the empirical research report to the symphonic composition to the expressionistic painting.

The **researcher** → **research method** → **research report** is a self-reflecting system in the same way that the **artist** → **artistic method** → **artwork** is a self-reflecting system. Both the researcher and artist are creatively constructing a reality, or mapping a territory. To explain the concept more vividly, it is appropriate to use a famous painting by Vincent van Gogh, titled: “*Vincent’s room in Arles, 1889*”, (see next page) as an example of self-reference.



In this painting, Van Gogh symbolically expressed through colour and composition how he experienced and perceived his bedroom. Although the painting can be regarded as an accurate reflection of reality, it cannot be regarded as reality itself. The artist's emotional, cognitive and physiological constitution as well as his socio-cultural environment contributed to his unique representation, which could be one of many. The painting is a reflection of Vincent's own image.

The room had been opened out like a stage set. The artist differentiates between colour and form to communicate subtle messages. His distinct use of bright and vivid colours reveals the fact that to Van Gogh it was the colour, not the form that determined the expressive content of his pictures. In letters to his brother Theo, Van Gogh described his way of describing, he gave descriptions of his choice of hues and the emotional meaning he attached to them:

yellow	→	faith, triumph, love
red, green	→	terrible human passions
cobalt	→	divine
carmine	→	spiritual colour

(Thames & Hudson, 1995)

During the creative process, the painting paints the painter as much as the painter paints the painting. In other words, the painting transforms the painter, as much as the painter transforms the painting. Van Gogh (in Weaver, 1990, p.112) confirmed this: “Painting does me good and drives away, I think, the abnormal ideas. It is comforting, as music is comforting”.

It is obvious that a recursive transformation process, that is a cybernetic circuit occurred within the artist – artwork system, the observing system. A parallel can be drawn to the context of the researcher, who is recursively part of his/her research process.

Vincent Van Gogh understood the pictorial language of the colour patch. Painting was a vessel for his personal emotion. A researcher should be familiar with the “*research tools*” and their eventual effect on the research results.

## 2.7 CONCLUSION

*“What thinks is the total system....which is man plus environment”.* Bateson (1972, p.483)

The systems theoretical approach enables a researcher to study person-environment transactions as dynamic patterns of interdependent relations, and not as two independent entities. Recursive feedback processes within the person – environment system are emphasised. Because of the emergent properties of a whole system, human experience and perceptions gain meaning only when viewed in relation to the context. The researcher is part of the observing system: “Human knowledge is a gradual continuous human construction made in interaction with the environment”. (Schwartz, 1977, p.25). Therefore, knowledge gained from a research project is a construction that reflects the characteristics of the observer, as well as the observed.

The next chapter will be a literature review on the nature of person-environment transactions, with regards to environmental stressors that cabin attendants’ experience.



## CHAPTER THREE

### A LITERATURE OVERVIEW

#### 3.1 THE RESEARCH CONTEXT

*“Without context, words and actions have no meaning at all. This is true not only of human communications in words, but also of all communication whatsoever, of all mental process, of all mind, including that which tells the sea anemone how to grow and the amoeba what he should do next.”*  
(Bateson, 1979)

Miles and Huberman (1984b, p.92) described the research context as “immediately relevant aspects of the situation, as well as the relevant aspects of the social system in which the person is functioning. This implies that cabin crew’s experience of environmental stress is not limited to their working environment, but is also the result of the broader socio-cultural network. Jordaan and Jordaan (1984, p.41) supported this viewpoint by stating that human experience, behaviour and problems cannot be properly known and understood “if they are divorced from the context in which they occur in everyday life”. Within the research context, differentiations can be made between smaller contexts. A brief description will consequently be presented of the *physical* and the *socio-cultural environments* as these pertain to the working environment of flight attendants.

##### 3.1.1 Physical environment

The Oxford English Dictionary, (1989) defined the term *environ* as “round about, in the neighbourhood”. The environment is that which surrounds, envelops, the circumference; the objects or the region surrounding anything. Fiedeldej-van Dijk (1993, p.160) remarked that “*environmental research contexts*” generally mean the interrelationship between the respondents under study and the physical, natural, geographical and climatic environment in which they live, and with which they are familiar”. Therefore, all identifiable components of the immediate environment that the respondents are in contact with, are part of the environmental context. The immediate environment of cabin crew in the aviation industry comprises pressurised aircraft cabins, air-conditioned hotel rooms, often reported by crew as impersonal. Noisy and crowded airports, foreign cities with unfamiliar faces all challenge the environmental adaptability of crewmembers.

Richards, Gottfredson and Gottfredson (1991, p.432) remarked:

“...settings rather than individuals, are the appropriate units of analysis for a wide variety of environmental research. No analysis based solely on individuals as the units of analysis can throw any light at all on the reliability, internal structure, or utility of a measure of setting characteristics”.

In a study of the perception of environmental stress, it is the person-in-environment transactions that are important. Cabin attendants experience constant environmental changes. The variety of environmental settings that cabin attendants are exposed to introduce a great amount of potential stressors.

Altman (1981, p.5) referred to the tendency to regard person-environment transactions as the basic units of analysis in social research as "the emerging revolution in psychology" and stated:

“Traditionally, the environment has been treated as a primary class of independent variables, and as being distinctively separate from behaviour and thereby existing in its own right. Environmental factors have been considered to be important determiners of behaviour, but they have been viewed as being separate, different and independent from psychological processes”.

Various authors support the importance of the relationship between people and their physical environment. Viljoen (1981) in Retief (1988) remarked that the interrelatedness between the environmental stimuli and the respondent's behaviour should be taken into account when observing the influence of environmental structures. Feldman (1975) cited in Fiedeldej-van Dijk (1993) described how a Roman architect, Marcus Vitruvius Pollio maintained that warm weather sharpened the intelligence of Southern peoples, while the cold weather of the Northern climates chilled the minds and produced overall sluggishness of thought among its peoples.

Ulrich (1991, p.225) stated that humans prefer natural environments above urban environments, and that natural environments are more beneficial for psychological well-being: “Content differences in terms of natural vs. human-made properties, rather than variations in stimulation levels, were decisive in accounting for the differences in recovery and intake/attention”. Estranged from nature, the working environment of cabin crew is a high-technology aviation

environment. Aspects of the physical environment may place adaptive demands on cabin crew and could possibly contribute to feelings of distress.

### 3.1.2 Socio-cultural environment

The socio-cultural environment constitutes the social networks that exist within a specific culture, as well as between various cultures. Gouws, Louw, Meyer, and Plug (1982) defined the term **social network** as “a pattern of formal and informal relations between members of a group”. A more comprehensive definition is proposed by Blau (1982, p.275) who remarked: “... social networks are composed of people's relations manifested in their interaction and, by implication, the roles and positions involved in and conditioning these relations”.

The socio-cultural environment at South African Airways changed dramatically since 1990, when transformation processes regarding racial discrimination, were initiated by the government. The aim of the company was a more representative workforce in relation to the demographics of South Africa. Different culture groups have to work together in the confined space of an aircraft. These changes took place rapidly, contributing to a stressful working environment, which required tolerance and comprehension from all cultures involved. The values and beliefs, languages and religions, traditions and lifestyles of all employees needed to be accommodated.

Friendships amongst cabin attendants are appropriately referred to as “*flying friendships*”, and are often characterised by high level of pettiness, backbiting and malicious rumour spreading. With regards to the aforementioned interpersonal problems, Porter (1988, p.96) concluded: the consequences of such anomalies ranged from indifferent acceptance, to high levels of frustration and disillusionment, possibly arising from frustrated needs for intimacy and meaningful social relationships”. In a qualitative analysis done by Porter (1988) the perception of social support amongst female cabin attendants is highly correlated to perceptions of self, self-image, social meaningfulness and quality of life.

The next section will focus on the definition of environmental stress, and two theoretical perspectives that illustrate the concept.

## 3.2 ENVIRONMENTAL STRESS

### 3.2.1 Definition

Antonovsky (1979, p.9) wrote about the omnipresence of stressors and concluded that “the human condition is stressful”. Early definitions of the concept of stress differentiate between two approaches, namely:

- The responses of the individual, and
- The situation that caused the disruption of behaviour.

Lazarus (1985) in Stokols and Altman (1987) was of the opinion that stress is inherently relational and cannot be reduced into separate personal and environmental components. Stokols and Altman (1987) stated that many stress researchers have overlooked the properties of physical situations, placing greater adaptive demands on the individual’s coping skills.

For the purpose of this study it would be appropriate to present a relational, interactive definition. Stress can be defined as “a complex rubric reflecting a dynamic, recursive relationship between environmental demands, individual and social resources to cope with these demands, and the individual’s appraisal of that relationship”. According to this definition, **stress is a process** that occurs when there is an imbalance between the perceived environmental demands and the perceived capabilities of an individual. For stress to occur, an individual must evaluate this imbalance, and decide that the environmental demands exceed his/her capabilities to cope with this imbalance. It is this decision that results in the experience of stress, or as Bateson (1972) rephrased the concept: “*a loss of flexibility*” as discussed in Chapter 2.

If an individual completes a task successfully which initially had been perceived as being extremely difficult, the person's perception of his/her abilities to perform tasks of this nature will also change. It can then be concluded that the stress associated with our perceptions of particular demands will progressively lessen as we progressively improve our abilities to cope with the environment and become more flexible.

Psychological perspectives on stress emphasise the role of interpretation of stressors in the stress response. The response of an individual to stressors is determined by the degree to which he/she perceives the event as threatening, harmful or challenging. Psychological responses to stress are well known to health practitioners: increases in general negativity, impatience, irritability, feelings of worthlessness and a decrease in problem-solving skills. In more severe cases emotional disturbances such as anxiety and depression are eminent. Health in mind and body are interrelated. The researcher decided to emphasise the often-neglected physiological aspects of the stress response. For the purpose of this study, only the physiological stress response will subsequently be discussed.

### **3.2.2 The physiological response to stress**

The scope of this dissertation allows for only a cursory account of the various intricate processes involved in stress. The physiological systems involved in the stress response are discussed below, after which two complementing physiological models of stress are discussed.

#### **3.2.2.1 Physiological systems involved in the stress reaction**

The brain and autonomic nervous system, in combination with the endocrine (hormone) system, control the body's internal organs. The control of body temperature, the circulation of blood, muscle movement and the activities of the gastrointestinal tract are not conscious. The autonomic nervous system is divided into two parts, the *sympathetic* and the *parasympathetic nervous systems*, both of which supply nerves to several vital organs.

#### **Sympathetic nervous system**

The cells of the sympathetic nervous system are situated in the spinal cord from the 8<sup>th</sup> cervical to the 3<sup>rd</sup> lumbar segments (Williams & Wilkins, 1961). The inner part of the adrenal gland - the adrenal medulla - is also essentially part of the sympathetic nervous system. Sympathetic stimulation appears to prepare the body for emergencies. Environmental stressors directly disturb the homeostatic balance of the body. According to Cannon (1932) in Stokols and Altman (1987) the sympathetic nervous system is an autonomic emergency response system allowing humans to fight or flee from any challenging situation.

### Parasympathetic nervous system

The cells of the parasympathetic nervous system are situated at three levels: the midbrain, the medulla oblongata and the sacral (lower) region of the spinal cord (Williams & Wilkins, 1961). The prefix “para” denotes a departure from the normal, alongside or near (Williams & Wilkins, 1982). The parasympathetic nervous system, alongside the sympathetic nervous system, serves a less prominent role during the stress reaction.

### The brain: the hypothalamus

One of the essential functions of the brain is to regulate the internal environment of the human being. The brain adaptively mediates the influences of the external environment on the internal environment. In terms of hormonal function, the hypothalamus is the highest brain structure (Kapit *et al* (1987) and is directly concerned with the body’s homeostasis and integration of internal activities.

Charles Sherrington, (in Kapit *et al.* 1987, p.101) a great English physiologist, named the hypothalamus the “*head ganglion of the sympathetic nervous system*”. This is so because of the marked effects of hypothalamic stimulation on the sympathetic nervous system. Strategically located in the base of the brain, underneath the thalamus (hypo- “thalamus”) and above the pituitary gland, it plays a major role in orchestrating the stress reactions in the lower glands.

Through hypothalamic stimulation certain hormones in the adrenal glands are mobilised. These hormones are the defence mechanisms of the body and are considered to be essential for life. Hormones cannot be excreted at a constant rate, but need to be adapted to the specific needs of the body in the midst of a specific environment. It is the function of hormones to keep the body’s homeostasis within the limits necessary to ensure survival.

### The adrenal glands

The adrenal glands are paired organs located on top of the kidneys. Each adrenal consists of two separate glands, which have different structures, embryonic origins and hormonal secretion. The inner part is called the *adrenal medulla*, secreting the hormones adrenalin and noradrenalin.

The *adrenal cortex*, the outer part of the gland, secretes a variety of steroid hormones. Cortisol is the chief steroid hormone secreted by the cells of the adrenal cortex. Cortisol is an anti-inflammatory hormone, but also has numerous other effects on the body, many of which are

intimately related to body responses in the presence of environmental stressors. According to Kapit *et al.* (1987), the removal of adrenal glands in humans and animals may be fatal if they are exposed to sudden unexpected stress.

### 3.2.2.2 The Fight or Flight reaction: The adrenal medulla

The stressful situations with which cabin attendants are commonly confronted today are quite different from those which human beings have had to face for most of their evolutionary history. Our ancestors had to recognise the threats in their environments and act without delay to survive the perils of prehistoric times. Avoiding predators, eating the right foods and protecting territory were part of the daily life of primitive people. They lived in tightly knit communities, which had a complex social support structure. Yet, the sensory and perceptual system with which we recognise stressors or danger and the physiological changes which occur when an environment is perceived stressful are still very much the same. Evidence supporting this statement includes the physiological changes characteristic of the fight or flight reaction. Cannon (1932) described the fight or flight reaction as the body's autonomic emergency response system, allowing the human or animal to fight or flee from any challenging situation.

Consider, for example, the following scenario. A cabin attendant spends 3 days off after a long haul flight with multiple time zone crossings, trying to get "in synch" with the environment. The following day, the cabin attendant gets caught out on Standby, because a colleague booked off sick at the last minute. Overcome by fatigue, frustration and anxiety the crew member rushes to the airport to be in time for the departure of the flight. Once on board the aircraft, there is total chaos. The flight is overbooked with 20 passengers, all of them in need of assistance. To worsen things, special meals that passengers have ordered with their bookings have not been loaded for the flight, while mothers with babies demand diapers, baby food and headache pills. As if that is not enough, several families complain they want to sit together as their seats were not booked next to each other. Emergency equipment need to be checked and reported in working condition, while dinner must also be prepared before take off.

At this stage, the cabin attendant might experience an imbalance between the perceived environmental demands and his/her perceived capabilities to cope with the demands. The brain, specifically the hypothalamus, receives messages from the environment through the body's various sensory receptors, that is through the eyes, ears, skin and nose, where the sequence of

events of the stress process begins. The hypothalamus responds in the same way than it did a thousand generations ago. That is, it does not differentiate between primitive cavemen trying to overtake one's cave, or noisy passengers demanding attention. On examining the effects of *hypothalamic stimulation* of the sympathetic nervous system, an interesting pattern emerges:

The sympathetic nervous system acts directly on the vesicles of the *adrenal medulla*, which upon stimulation releases the hormones *adrenalin* and *noradrenalin* into the blood. These hormones heighten the response readiness of the body. For example, air passages to the lungs dilate, making rapid breathing easier, the iris of the eye dilate the pupil, permitting more light into the eyes to enhance vision, the heart beats faster and stronger, and the liver releases glucose into the bloodstream, which makes energy readily available. Blood vessels constrict to peripheral areas of the body, where blood supply is not so much needed for survival, for example the digestive system. Consequently, more blood flows to vital organs, that is the heart, kidneys, brain and muscles, where it is needed most. Each time the sympathetic nervous system is strongly stimulated by the hypothalamus, the activity of the *adrenal medulla* increases, and more hormones are released into the bloodstream, perpetuating the cycle. In short, the function of the adrenal medulla is synergistic and complementary with the functions of the sympathetic nervous system.

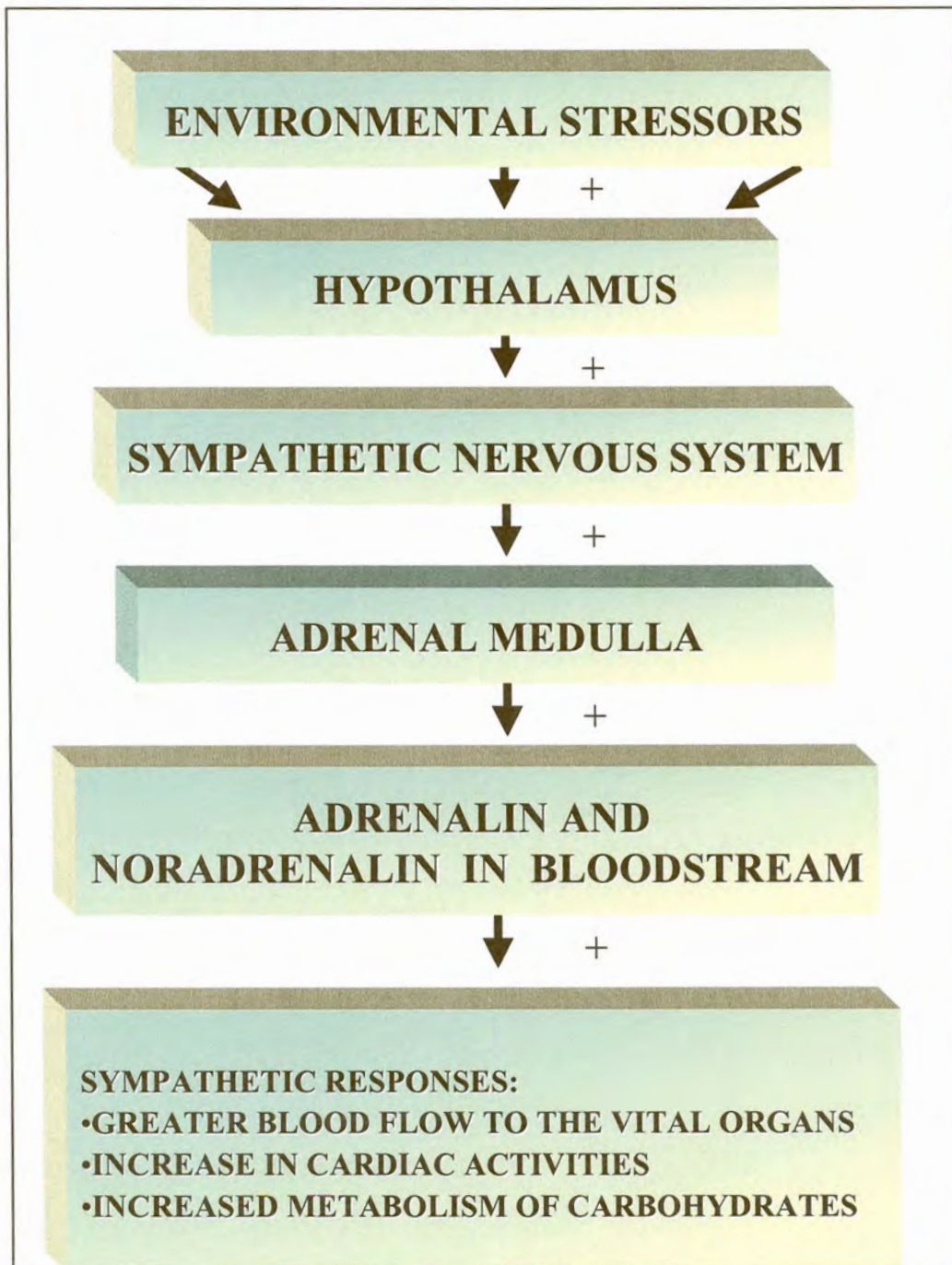
The adaptive value that the aforementioned physiological stress response had for primitive cavemen is evident. However, angry red faces with dilated pupils, rapid breathing, gnarling teeth and growling noises are not the appropriate responses for cabin attendants trying to cope with demanding passengers. They need to stay calm, think clear and as often instructed during training, "kill" the passengers with kindness.

Cannon (in Stokols & Altman, 1987, p.576) stated that continuous exposure to this emergency response syndrome, might have detrimental long term effects for the individual: "...we do know that chronically increased levels of circulating catecholamines (adrenaline and noradrenalin) have direct links to cardiovascular diseases and high blood pressure".

On the following page, the physiological systems and processes involved in the fight or flight response are diagrammatically depicted in Figure 1.



**FIGURE 1: THE FIGHT OR FLIGHT RESPONSE**



### 3.2.2.3 The General Adaptation Syndrome: the adrenal medulla

The Fight or flight model mentioned in the previous section depicted a short-term reaction to stressful situations. Hans Seley (1956) cited in Stokols & Altman (1987) developed a model of the stress response describing a long-term reaction to stress. According to Seley (in Stokols & Altman, 1987) psychological and physiological stressors elicit non-specific physiological

reactions. The non-specific effects, which Seley called the *general adaptation syndrome*, include three stages: alarm, resistance and exhaustion.

### Stage 1: Alarm phase

A variety of environmental stressors act on the brain, specifically on the hypothalamus to elicit the release of hormones, which in turn stimulate the release of corticotrophin from the pituitary gland, a pea size gland at the base of the hypothalamus. Corticotrophin acts on the adrenal cortex, stimulating the synthesis and release of cortisol. Cortisol stimulates the synthesis of glucose in the liver, which ensures adequate energy supplies for the brain and heart. In addition, cortisol reduces the uptake of glucose by muscle cells, sparing glucose supply for the heart and brain. This adaptation is necessary to mobilise the body to deal with the stressful environment.

### Stage 2: Resistance phase

During the second stage, the organism seems to have adapted to the stressor, successfully resisting it. The increased release of cortisol occurs rapidly, within a few minutes. According to Kapit *et al* (1987) this increase sets up a feedback loop, stimulating the adrenal medulla activity and subsequent release of catecholamines (adrenalin and noradrenalin.). Once the cortisol level is sufficiently high, hormone secretion is decreased through the negative feedback effect of cortisol on the hypothalamus. This resists or reduces the cortisol level back to the normal condition. When stress is chronic, the brain overrides this control, with the effect that high levels of cortisol circulate in the blood stream. In short, cortisol and catecholamines function synergistically to promote the body's adaptation and defence mechanisms.

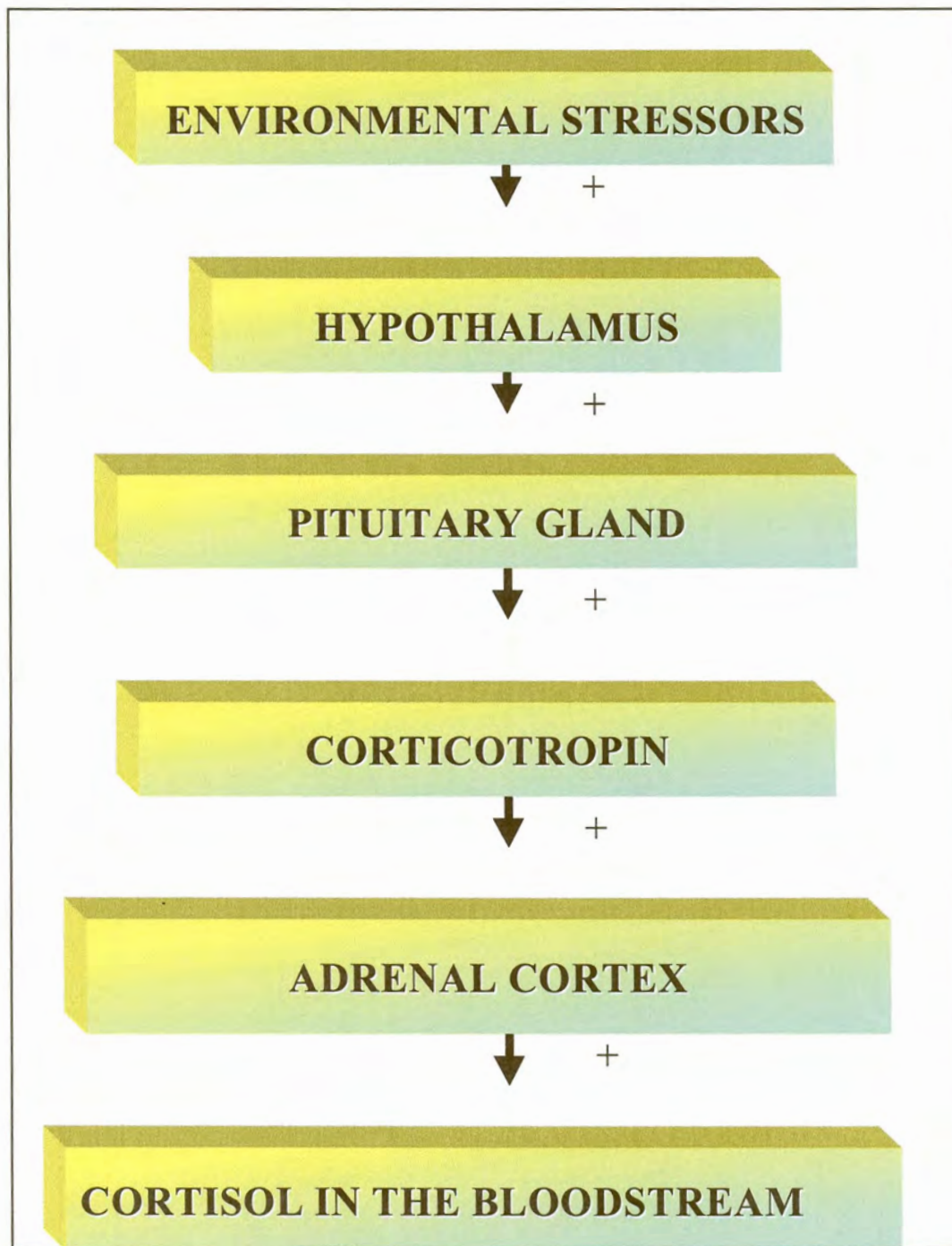
### Stage 3: Exhaustion

Stress may be additive. The body has only a finite amount of adaptive energy, and when this capacity has been exceeded, the effects can be detrimental. Exhaustion occurs if the environmental stressor is sufficiently prolonged or so severe that the body's defences are completely depleted. Stokols and Altman (1987, p. 576) stated that during the exhaustion phase "...the adrenal glands are unresponsive to environmental demands, with various susceptible organs suffering breakdown or damage". In response to chronic environmental stressors, prolonged and excessive secretions of cortisol, can cause stomach ulcers by stimulating acid

secretion in the stomach, decreased immunity, because of a reduction in white blood cells, and high blood pressure as a result of vascular disorders.

The systems and processes involved in Selye's General adaptation syndrome, are diagrammatically depicted in Figure 2 on the next page.

**FIGURE 2: THE GENERAL ADAPTATION SYNDROME**



### **3.3 DIMENSIONS OF ENVIRONMENTAL STRESSORS**

Various dimensions of environmental stressors can be identified. Dimensions that have relevance to this study will consequently be summarised.

#### **3.3.1 Perceptual salience**

This dimension refers to the degree to which a stressor is easily noticeable. If a stressor is chronic, of low to moderate intensity and uncontrollable, it becomes less noticeable. According to Glass and Singer (1972) in Stokols and Altman (1987) habituation in response sensitivity and general awareness is a result of chronic exposure to many low level, ambient stimuli. Engine vibration and moderate turbulence become background stimuli to cabin crew, where as to a first time flyer, it might be a terrifying experience.

#### **3.3.2 Type of adjustment required**

Environmental conditions that are very intense, sudden and uncontrollable are more likely to lead to accommodation and emotion-focused coping, rather than efforts to deal with the stressor directly (Kiretz & Moos, 1974; Lazarus & Cohen, 1977). An example of such a sudden and intense environmental stressor would be an emergency situation where an aircraft tyre burst on impact during landing. Cabin crewmembers have to stay calm, keeping the passengers under control and follow the emergency procedures. Continuous exposure to these conditions, has psychological and physiological consequences, which may influence the health of cabin crew.

#### **3.3.3 Predictability of stressors**

Some environmental stressors are more predictable than other. Predictability may influence the way cabin crew chooses to cope with the stressor. If the number of days that cabin crew stays in a specific country suddenly changes due to changes in the flight schedule, crew might experience intense frustration. Technical defects of an aircraft result in flight delays, often for an indefinite time. Changes in passenger totals at the last minute before take-off may also challenge the coping skills of cabin crew. These examples demonstrate the unpredictability of events in the aviation environment.

### 3.3.4 Duration and periodicity of environmental stressors

Related to predictability is periodicity, which refers to the regularity and continuity of the stressors. It is important to differentiate between stressful life events and chronic sources of stress. Stokols and Altman (1987, p.574) remarked: "Life events are major incidents in the lives of people that typically require personal or social adaptive responses". The difference is that stressful life events occur within a certain time frame, while chronic stress is continuous, with no delineated time frame. Rapid environmental change, noisy and crowded aeroplanes as well as unresolved interpersonal conflicts with friends and family are examples of chronic strains that cabin crew seem to experience.

According to Stokols and Altman (1987) the extent of previous personal history with the stressor, as well as the length of current exposure to the condition, affect the human adaptation processes. This raises the question if cabin crew with longer years of service cope better with environmental stressors than crew with fewer years of aviation experience.

### 3.4 WORK SCHEDULE STRESS

Work schedule stress was identified as a main stressor in the lives of 75 female cabin crew members at the SAA by Porter (1988, p.126): "It was brought to mind that work schedule involve much more than just hours of work". The working environment of cabin crew involves a whole lifestyle. Kennedy (1986, p.5) in Parker (1988) suggested that work schedule stress is a major health hazard for cabin crew and that people are "*dying of their lifestyle*".

Psychological consequences of work schedule stress amongst female crewmembers as reported by Porter (1988), are irritability and quick temperedness. Negative self-perceptions were evident in those cabin attendants which experienced sleep-related problems and an inability to cope with the work schedule demands. Feelings of loneliness, of "being out of touch" and depression emerged as significant consequences of work schedule stress. Aggressive thought patterns were evident in those female cabin attendants who experienced high levels of stress (Porter, 1988). In the same study, some female cabin attendants reported more serious consequences, such as having experienced or being on the verge of a nervous breakdown.

With regards to physiological consequences, the most frequently reported symptom was fatigue, being related to the non-routine nature of the work schedules and the subsequent disruptive effect on sleeping patterns. The body seems unable to adjust to the abnormal hours and flying itself. Enhanced levels of susceptibility to colds and influenza, menstrual problems, indigestion, constipation, headaches, insomnia, shoulder tension and blood pressure problems were reported by female cabin attendants (Porter, 1988). Seley (1982) cited in Porter (1988) described all these disorders as “disorders of adaptation”. The results of the aforementioned study demonstrate that work schedule stress played a large contributory role in the physiological consequences.

Considering these results, it is necessary to reiterate that psychological and physiological subsystems are interdependent and mutually influence each other. Porter (1988) remarked that the responsibility lies with individual cabin attendants to engage in activities that minimise the negative side effects of this unique lifestyle.

### **3.5 CIRCADIAN RHYTHMS: THE CYCLE OF LIFE**

*“Slowly, as our physical reality became less wild and more technological, we needed to create a new psychic context for ourselves. But since we did this out of terror, we ended up dreaming a dream of a world in which we humans had complete control. We created techno-utopia”.*

*Glendinnig in Sessions (1995, p.39)*

#### **3.5.1 The discipline of chronobiology**

Chronobiology reasserts the ancient emphasis on the rhythm of life and is concerned with the rhythmic properties of any living organism. The most common rhythms exhibited by man have cycles of about 24 hours, and are termed *circadian rhythms*, from the Latin ‘circa’ – about, and ‘dies’ – day. Physiological processes in the body exhibit regular rhythmic fluctuations, which occur whether an individual is kept awake or allowed to sleep. These rhythms are controlled internally but are sensitive to fluctuations in the external environment. The disruption of these natural cycles, as seen in cabin crew, has negative effects on health and physical wellbeing. Renè Dubos (in Stringer, 1975, p.303) remarked:

“It is questionable that man can retain his physical and mental health if he loses contact with the natural forces that have shaped his biological and mental

nature. Man is still of the earth, earthly, and like Anteus of the Greek legend, he loses his strength when both his feet are off the ground”.

### **3.5.2 Cabin attendants and the circadian clock**

The aviation industry is a technological advanced environment and provides a 24-hour client service. As humans, the circadian clock is our evolutionary heritage. We are programmed for periods of wakefulness and sleep, high and low body temperature, high and low digestive activity and increased and decreased performance capability. For example, the circadian rhythm of body temperature is programmed for the lowest temperature between 3 and 5 am on a daily basis, which is also the period of maximal sleepiness. When the circadian clock is moved to a new work/rest schedule or put in a new environmental time zone, it does not adjust immediately. This is the basis for the circadian disruption associated with jet lag. The body’s internal physiological rhythms do not all adjust at the same rate, and therefore may be out of synch with each other for an extended period of time. According to Rosekind *et al.* (1991) it may take weeks for all the internal rhythms to come together in a synchronous 24-hour rhythm in the new time zone. It would be interesting to know which rhythms adapt faster and which rhythms take longer to adjust to a new time zones. In this regard, it is important to note that there are huge differences in individual physiological flexibility for adaptation of the circadian clock and the ability to tolerate sleep loss. There could be a range of individual responses for any particular environmental demand. It is therefore possible that some cabin attendants may report more difficulties in adjusting to the swiftly changing time zones.

Wiener *et al.* (1988, p.308) emphasised that additional stress results from the irregularity of the duty hours of cabin attendants: “There are wide daily variations in the number and timing of flights both within and between such trips, requiring crew to frequently alter their work and rest schedules”. Moving from a day to a night schedule and back to a day schedule, can keep the clock in a continuous state of readjustment. In this regard, Monk (1994) cited in Porter (1988) remarked that all of the difficulties associated with the of moving the clock, such as poor sleep, sleepiness and effects on performance, will be affected until the circadian clock physiologically adapts to the new schedule or time zone. Another factor to take into consideration is the direction, which the circadian clock is moved. Shortening the period (for example, moving to a 21-hour cycle or day) is generally more difficult than lengthening the period (for example, moving to 25 or more hours), which is the natural rhythm of the circadian clock. Therefore, it



can be more difficult to cross time zones in an eastward direction compared to westward movement.

### **3.6 CONCLUSION**

The aviation industry in which cabin crew operate introduces a great amount of potential environmental stressors. From the research literature it is clear that the inversion of rest and activity cycles from the normal day orientation is a major stressor for cabin attendants. Unfortunately, the technology for overcoming this human handicap lags far behind that for overcoming our lack of wings.

In the next chapter, the method of data collection and data analysis, as well as the rationale for the chosen method is explained.

#### 7.4 "THAT REMINDS ME OF A STORY ...."

*"The fountain of content must spring up in the mind, and he who hath so little knowledge of human nature as to seek happiness by changing anything but his own disposition, will waste his life in fruitless efforts and multiply the grief he proposes to remove".*

*Samuel Johnson*

Bateson considered stories, parables and metaphors to be essential expressions of human thinking. He would never deal with any idea in a purely abstract way, but would always present it concretely by telling a story. Since relationships are the essence of the living world, one would do best, Bateson maintained (in Capra, 1989) if one spoke a language of relationships to describe it. This is what stories do. A story connects people from different contexts or backgrounds to one another. The following story is an ancient one, full of images and symbols, told by Bushmen from generation to generation. However, its meaning is as relevant to humankind today as it was to the Bushmen who created it centuries ago. The story is simple and describes a primitive man's experience of losing "meaning" or "soul" in life:

There was once a man who lived happily by keeping cattle. One morning he found that his cows had no milk to give. (In other words, the story is telling us that he had arrived at a moment in his own life when his old ways no longer provided him with sustenance). He took them to better grazing grounds, but they still had no milk to give. He decided to keep watch on the cattle in their kraal. During midnight he saw a cord coming down from the stars, with beautiful young women with containers, who started milking his cows. When they saw him, they scattered immediately and ran up the cord as fast as they could. He managed to catch hold of one of the girls, who still had her container with her. She said that she was happy to become his wife but on the following condition: she will fill the container full of starlight, and he must promise that he will never look in this container without her permission. He promised her that and they lived happily for months. One day, the man got irritated with the container and decided to look into it, while his wife was in the fields. He could not see anything in the container and perceived it as empty. That evening when she came home, she knew immediately that he had looked into her container and was very upset. He told her: 'You silly creature! Why have you made such a

fuss about an empty container?' 'Empty?' she uttered, distressed. 'Yes, empty!' And at once she became very sad, turned her back on him, walked straight into the sunset and was never seen again on earth.

The problem here was not the fact that the man had broken his promise to his wife. Rather, the man could not see anything in the container, although it was full of starlight that the beautiful girl brought down for both of them. To him it was empty, without any meaning. This is an image of the moment in our lives when we can no longer see what we have naturally in our containers, the moment we experience a loss of meaning in our lives. It is not that we have empty containers, but rather that we have lost the capacity to see its content, to enjoy meaning and fulfilment in life and to live passionately. This loss was a loss of soul for the cattleman and implied a living death for him thereafter.

What cabin attendants at SAA "see" (experience) in their "containers" (working environment), should not be understood in terms of their visual sense of sight, but in terms of the understanding and the interpreting of their experiences. With regards to this, Capra (1987, p.320) remarked: "The patterns we perceive around us are based in a very fundamental way on the patterns within. Patterns of matter mirror patterns of mind, coloured by subjective feelings and values". The respondents imposed their own patterns or meaning, unconsciously, on their experiential world.

It is therefore not only the working environment that needs change, but also the cabin attendants' ability to make sense out of their working environment. This change incorporates a belief in the possibility of determining one's own fate and an attempt to make the most out of a situation. For all living things *growth* is a necessity of survival. Man survives not by adjusting himself to his physical environment in the manner of an animal, but by transforming his environment through intellectual and emotional growth. In this regard, Ayn Rand (1964, p.121) remarked:

"An animal's capacity for development ends at physical maturity and thereafter its growth consists of the action necessary to maintain itself at a fixed level. After reaching maturity it does not, to any significant level continue to grow in efficacy - that is, it does not significantly increase its ability to cope with the environment. But man's capacity for development does not end at physical maturity; his capacity is virtually limitless. His power to reason is man's

distinguishing characteristic, his mind is man's basic means of survival - and his ability to think, to learn, to discover new and better ways of dealing with reality, to expand the range of his efficacy, to grow intellectually, is an open door to a road that has no end.

## **7.5 CONCLUSION**

As mentioned in Chapter 2, it is not possible for a researcher to describe or understand the complexity of the interconnecting parts of any system or phenomena completely. Korzybski (1979-1950) emphasised that descriptions are simplified versions and not accurate presentations of real-life situations. With regards to this, Bateson (1979, p.100) stated: "I surrender to the belief that my knowing is a small part of a wider integrated knowing that knits the entire biosphere or creation". In agreement, Keeney (1979, p.47) remarked: "As one of Birdwhistell's (1970) students put it, it's (doing research on human behaviour) like trying to understand a drainage system from a 6-inch slice of river". However, this study has achieved it's objective if the reader was encouraged to think about the behaviour of cabin attendants in terms of various transacting contexts, circular causality or patterns that connect.