
Elisabeth Vanderheiden
Claude-Hélène Mayer Editors
Mistakes, Errors and Failures across Cultures
Navigating Potentials
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Editors
Elisabeth Vanderheiden
Catholic Adult Education of Germany
Römerberg, Germany

Claude-Hélène Mayer
Department of Industrial Psychology
and People Management
University of Johannesburg
Johannesburg, South Africa

Institut für Therapeutische Kommunikation
und Sprachgebrauch
Europa Universität Viadrina
Frankfurt (Oder), Germany

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Foreword

I was delighted that Elisabeth Vanderheiden and Claude-Hélène Mayer asked if I could provide a Foreword to their interesting book exploring the genesis of mistakes. Mistakes are perhaps the most common of human errors and often the least understood. My delight came from the fact that the invitation came just as I was completing the renewal of my Certified Instrument Flight Instructor (yes, researchers do have lives outside of the laboratory). To be sure, aviation has had an understandable concern with eliminating mistakes. For the layman, this concern has seemed to be focused on commercial operations. CRM (cockpit resource management) came about after the crash of a United Airlines DC-8 in the northwest which ran out of fuel shortly before landing at the airport. The analysis of the incident revealed that the crew depended too much on the captain as they tried to solve a problem all the while using precious fuel. That incident resulted in the airline, followed by the entire industry, to adopt training on how to delegate and integrate the resources of the crew, hence CRM. But in the public's mind, there seems to be less concern about general aviation in avoiding, if not eliminating, mistakes. Many of the mistakes in this domain may not result in the loss of life, though some do. One case I remember well was that of a doctor and his wife who set off in their single engine for a trip for a mid-south state to Texas. The pilot carefully calculated the amount of fuel he would need to easily reach an airport for refueling. However, for reasons unknown, he underestimated the strength of headwinds as they approached the airport. When on final approach, they ran out of fuel and hit trees just off the end of the runway. Both lives were lost. Another example is from my own early days as a pilot. We had just moved to a state in the Southern United States to a town about 50 miles away from the Mississippi River. On one of those perfect VFR days, we decided to fly over to the river and see the barges from a thousand feet. So, we flew up and down the river for a while and then headed back to the home base. Now, this was normally a 45-minute jaunt in our 172, but it seemed to drag on and on. And then I realized I was lost; all the land looked the same. The two lakes that bracketed the home airport were nowhere to be seen. Finally, I called for help from ATC, who found me, and I realized that we had drifted 50 miles south. Yes, a mistake in that as a new pilot is that I forgot to use the instruments in the plane to triangulate between

two VORs and keep myself on course. But it was an unintentional mistake. But, one, if the weather had turned nasty, could have had undesirable consequence. The point being that there are intentional mistakes (usually accompanied by the optimism bias), such as scud running and unintentional errors. Over the years, the CFI training has significantly changed to a focus on risk assessment and mitigation. And I would suggest that the concept of risk assessment can be applied outside of the aviation community, e.g., in analyzing vehicular accidents such as starting a trip on an icy day without considering the probability of losing control.

What this book takes as its rationale is "are mistakes, errors, and failures culture bound?" To be sure, in aviation, we have known for some time that cultures that are highly hierarchical make for problems in the cockpit. For example, a Korean Airlines 747 crashed on approach to a landing because the first officer would not forcefully speak up when he realized that the captain was allowing the plane to drop below the glide slope. The analysis suggested that Korean culture vested almost god-like characteristics in the captain. As a result, Korean revamped its entire training and evaluation program. Of course, this issue is not confined to one airline or one country; similar events have occurred in many countries. But we tend to see these issues, at least before this book, as restricted to certain occupations and not generally spread throughout the culture and through many aspects of everyday living. For that reason, this book can serve as a guide to future research on mistakes, errors, and failures.

This is an important book; the chapters are written with care to the existing research and applications to real-world issues. The authors are to be commended for advancing our knowledge of this critical area.

Dan Landis completed his PhD in General-Theoretical Psychology from Wayne State University in 1963. He has held several academic and research positions. He is currently Affiliate Professor of Psychology at the University of Hawaii at Mānoa, Professor Emeritus of Psychology, and Dean Emeritus of the College of Liberal Arts, University of Mississippi. He is also Past Chair of the Department of Psychology, Indiana University-Purdue University Indianapolis, Research Psychologist at Educational Testing Service, Senior Research Psychologist at the Franklin Institute, and Visiting Research Professor at the East-West Center; Defense Equal Opportunity Management Institute (DEOMI); University of Illinois; Victoria University in Wellington, NZ; and Primate Laboratory, University of Wisconsin. He is the Founding Editor in Chief of the *International Journal of Intercultural Relations* (1977–2011), the Founding President of the International Academy for Intercultural Research, and the Coeditor/Author of *Ethnic Conflict: International Perspectives* (1985), of the three editions of the *Handbook of Intercultural Training* (1986, 1996, 2004), of the *Handbook of Ethnic Conflict: International Perspectives* (2012), and of *Neuroscience in Intercultural Contexts* (2015). A Mandarin translation of the 2004 Training Handbook was published by Peking University Press in 2010. He is an Elected Fellow of several organizations: American Psychological Association, Association for Psychological Science, Society for the Psychological Study of Social Issues, Division of International Psychology of APA, and

International Academy for Intercultural Research. He is listed in Who's Who and other biographical compendiums. In 2007, he was given a Lifetime Achievement Award by the International Academy for Intercultural Research and, in 2012, was honored by the American Psychological Association with its award for Distinguished Contributions to the Internationalization of Psychology.

Keaau, HI, USA

Dan Landis
danl@hawaii.edu

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Elisabeth Vanderheiden
Making mistakes, admitting errors, or experiencing failure is often initially associated with very painful experiences. It is often shameful, can trigger feelings of guilt, can cause great suffering and deep crises, and can have serious personal, professional, legal, or material consequences. But ideally, these events also initiate deep holistic learning opportunities, chances for reorientation, and manifold occasions to develop new visions as a person, organisation, collective, or society, to discover new skills and resources, and to take unknown paths at the crossroads of professional or private life decisions. In this sense, I thank all the people who have given me the opportunity to make mistakes and fail because these extraordinary learning opportunities and catalysts for my personal and professional development would not have existed without them. Above all, I thank those who stood by my side on these occasions, inspired me, and walked with me for a little while or longer on my way to new and sometimes unknown terrains of knowledge, action, and changed life practice.

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Editors and Contributors

About the Editors

Elisabeth Vanderheiden is a Pedagogue, Theologian, Intercultural Mediator, and Managing Director of the Catholic Adult Education Rhineland-Palatinate, and the President of the Catholic Adult Education of Germany. Her publishing focus centers on the context of basic education for adults, in particular on trainings for teachers and trainers in adult education, as well as vocational and civic education, and edited books on intercultural opening processes and intercultural mediation. Her latest publications focused on shame as resource as well as mistakes, errors, and failures and their hidden potentials in the context of culture and positive psychology. She also works as an Independent Researcher. In a current project, she investigates life crises and their individual coping strategies from different cultural viewpoints. A topic that has also aroused her research interest is humor and how it appears in different cultural perspectives and from various scientific disciplines. She lives in Germany and Florida.

Claude-Hélène Mayer (Drhabil, PhD) is Professor of Industrial and Organizational Psychology at the Department of Industrial Psychology and People Management at the University of Johannesburg; an Adjunct Professor at the European University Viadrina in Frankfurt (Oder), Germany; and a Senior Research Associate at Rhodes University, Grahamstown, South Africa. She holds a PhD in Psychology (University of Pretoria, South Africa) and in Management (Rhodes University, South Africa), a Doctorate in Political Sciences focusing on sociocultural anthropology and intercultural didactics (Georg-August University, Germany), and a Habilitation in Psychology (European University Viadrina, Germany) with focus on work, organizational, and cultural psychology. She has published several monographs, text collections, accredited journal articles, and special issues on transcultural mental health and well-being, sense of coherence, shame, transcultural conflict management and mediation, women in leadership in culturally diverse work contexts, constellation work, coaching, and psychobiography.

Contributors

Umut Altunoz MD senior psychiatrist & psychotherapist, Wunstorf Psychiatric Clinic, Hannover Region Clinics, Wunstorf, Germany.

Alice Anderson Manager of Audience Research and Impact, Minneapolis Institute of Art, USA.

Thalita Camargo Angelucci Psychologist Federal University of São Carlos (UFSCar, Brazil), PhD Student at the National University of Rosario (UNR, Argentina).

Christine Bales Student of rehabilitation psychology B.Sc., occupational therapist, Stendal and Göttingen, Germany.

Paul Barach MD, MPH, anesthesiologist and critical care physician physician-scientist, Clinical Professor Wayne State University School of Medicine, and Children's Hospital of Michigan, USA.

Maria Belz Dr., Graduated psychologist and in training to become a certified behavioral psychotherapist, Göttingen, Germany.

Maike Baumann scientific associate University of Potsdam, Germany.

Katja Brinkmann student applied psychology B.Sc., Göttingen, Germany.

Jan S. Brommundt (Dr.) is medical doctor in anaesthesiology as well as international, humanitarian and disaster medicine, University Medical Center Groningen, The Netherlands.

Alessandro Carretta PhD, Full Professor in Economics and Management of Financial Intermediation, former Director of the Program in Banking and Finance at University of Rome Tor Vergata, Italy.

Franziska Carow student of health communication, Department of Population Medicine and Health Services Research at Bielefeld, Germany.

Clifford H. Clarke ABD, teaching intercultural communication at Stanford and the University of Hawaii, USA, Japan.

Hannah Eger BA health communication at Bielefeld, Germany.

Lucrezia Fattobene Assistant Professor in Financial Markets and Institutions at LUM Jean Monnet University, Bari, Italy.

Florian Fischer (Dr.) Postdoc researcher at Bielefeld University, Germany.

Saraswathie Govender Associate Professor, University of Limpopo, South Africa.

Zhi Guo research fellow in the Department of Industrial Engineering, Tsinghua University, China.

Mary Hallay-Witte certified religious pedagogue, research associate at Medical School Hamburg, Hamburg.

Jan U. Hagen (Prof. Dr.) associate professor at ESMT European School of Management and Technology in Berlin, Germany.

Bettina Janssen (Dr. iur.) solicitor, mediator (BM), supervisor (DGSV), coach (ECA), Cologne, Germany.

Klas-Göran Karlsson (Dr.) Professor of History, Lund University, Sweden.

James L. Kelley Researcher and writer, USA.

Aliraza Javaid BSc Criminology, MSc Clinical Criminology, MRes Social Sciences, PhD in Sociology and Social Policy, United Kingdom.

Dan Landis PhD, Affiliate Professor of Psychology University of Hawaii at Manoa, Professor Emeritus of Psychology, and Dean Emeritus of the College of Liberal Arts, University of Mississippi, USA.

Fernando Lanzer Pereira de Souza B.A. Clinical, Educational and Organisational Psychology, guest lecturer at business schools in Europe and Brazil, The Netherlands.

Xin Lei PhD student in the Department of Industrial Engineering, Tsinghua University, China.

Josua Leibrich student od psychology B.Sc., Göttingen, Germany.

Václav Linkov (PhD), researcher in transportation psychology, Brno, Czech Republic.

Adam V. Maltese (PhD) Associate Professor of Science Education at Indiana University and director of the MILL Makerspace, Indiana University, USA.

Lolo Jacques Mayer young author and public speaker. Germany and South Africa.

Kathryn Anne Nel (Prof. PhD), Industrial Psychology, University of Limpopo, South Africa.

Elmar Nass (Prof. Dr. Dr.), Professor of Economic and Social Ethics at the Wilhelm Loehe University Fürth, Germany.

Rudolf M. Oosthuizen DLitt, associate professor Department of Industrial and Organisational Psychology University of South Africa.

Ibrahim Özkan (Dr.) Graduated psychologist and certified psychological psychotherapist, Göttingen, Germany.

Bo Petersson Professor of Political Science and IMER (International Migration and Ethnic Relations), Malmö University, Sweden.

Wayne Petherick (PhD) Associate Professor of Criminology Bond University Queensland, Australia.

María Isabel Pozzo Professor, Licentiate and Doctor in Educational Sciences from the National University of Rosario (UNR, Argentina).

Nan Qie doctoral candidate at Tsinghua University, China.

Pei-Luen Patrick Rau Professor Industrial Engineering and Global Innovation Exchange Institute, Tsinghua University, China.

Paul C. Rosenblatt PhD Professor Emeritus Family Social Science at the University of Minnesota, USA.

Thomas Ryan (PhD), Associate Professor Philosophy and Theology of the University of Notre Dame Australia.

Amber Simpson Assistant Professor Department of Teaching, Learning, and Educational Leadership, Binghamton University, Binghamton, NY, USA.

Paola Schwizer Full Professor Financial Markets and Institutions University of Parma (Italy) and Professor at SDA Bocconi School of Management, Italy.

Chris P. Subbe (Dr.), Senior Clinical Lecturer at the School of Medical Sciences, Bangor University, United Kingdom.

Karel Stanz Professor Industrial Psychology University of Pretoria, South Africa.

Euisuk Sung (PhD), postdoctoral researcher at Indiana University, USA.

Naomi Takashiro (PhD), adjunct faculty at the Kyoto University of Foreign Studies and Junior college Kyoto, Japan.

Matita Tshabalala Industrial Psychologist, Aviation Psychologist, Pretoria, South Africa.

Jaco van der Westhuizen (PhD), Ex-Air Traffic Controller and Human Factor Specialist, Pretoria, South Africa.

Sofia von Humboldt (Prof. Dr.), Associate Professor and Principal Investigator, William James Center for Research at ISPA-Instituto Universitário, Lisbon, Portugal.

Janina Wesolowski B.Sc., student of psychology, Hannover Medical School, Germany.

Andong Zhang PhD student, Department of Industrial Engineering, Tsinghua University, China.

Petr Zámečník Head of Department of Traffic Psychology, Transport Research Centre, Brno, Czech Republic.

Chapter 1
"There Is a Crack in Everything. That's How the Light Gets in": An Introduction to Mistakes, Errors and Failure as Resources

Elisabeth Vanderheiden and Claude-Hélène Mayer

"I have often said that from the amoeba to Einstein there is only one step. Both work with the method of trial and error. The amoeba must hate error, for it dies when it errs. But Einstein knows that we can learn only from our mistakes, and he spares no effort to make new trials in order to detect new errors, and to eliminate them from our theories. The step that the amoeba cannot take, but Einstein can, is to achieve a critical, a self-critical attitude, a critical approach. It is the greatest of the virtues that the invention of the human language puts within our grasp. I believe that it will make peace possible."

Karl Popper, All Life is Problem Solving

Abstract To fail in a task, to misjudge a situation and to make wrong conclusions, or to be unable to achieve a desired goal, are basic human experiences that occur in everyday activities as well as in longer-term projects in the context of personal development. But the assessments of what is a mistake, an error, or a failure depend heavily on cultural as well as individual contexts. Errors, failures and mistakes do

"There is a crack in everything (there is a crack in everything) That's how the light gets in". *Leonard Cohen, Anthem*

E. Vanderheiden (✉)
Catholic Adult Education of Germany, Römerberg, Germany
e-mail: ev@keb-rheinland-pfalz.de

C.-H. Mayer
Department of Industrial Psychology and People Management, University of Johannesburg, Johannesburg, South Africa

Institut für Therapeutische Kommunikation und Sprachgebrauch, Europa Universität Viadrina, Frankfurt (Oder), Germany

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not constitute objectively ascertainable facts, but are subject to the validity of certain rules within a context-dependent judgement. These rules can exist in various forms and degrees of explicitness and are adopted in the course of social negotiation processes. The aim of this book is to synthesise empirical research-based and theoretical perspectives on mistakes, errors, and failure in and across cultures, in order to provide a comprehensive view of contemporary research and practice which is accessible to researchers and practicing professionals internationally.

Mistakes or errors can, at the individual level, cause deep shame and embarrassment, and can lead to severe personal, organisational and collective crises. However, they can also be viewed as a resource for self-development and organisational, collective and societal change. At the organisational level, mistakes, errors and failure can have serious consequences for individuals such as employees or clients in the field of transportation, or in the context of medicine or chemistry, for example. At the same time, they can reveal inaccuracies in process chains, or weaknesses in a system, and they can also trigger contingent and sustainable improvement processes on all levels. Even in the political context, actual or perceived wrong decisions can have massive and long-lasting consequences for individuals, societal groups and subcultures, and for the society as such. Societal mistakes, errors and failures might then even be discussed in global contexts and in terms of their universal impact.

Keywords Mistakes · Error · Failure · Resource · Across cultures

1.1 Introduction

To fail in a task, to misjudge a situation and to make wrong conclusions, or to be unable to achieve a desired goal, are basic human experiences that occur in everyday activities as well as in longer-term projects in the context of personal development. But the assessments of what is a mistake, an error or a failure depend heavily on cultural as well as individual contexts (see Backert 2004; Pitta et al. 1999; Frese and Keith 2015; Mu et al. 2015; Chaps. 5, 11, 13, 23, 26 and 31). Errors, failures and mistakes do not constitute objectively ascertainable facts, but are subject to the validity of certain rules within a context-dependent judgement (Reason 1990, 1995, 2005; Lei 2018; Giolito and Verdin 2018). These rules can exist in various forms and degrees of explicitness and are adopted in the course of social negotiation processes (Heid 1999). The aim of this book is to synthesise empirical research-based and theoretical perspectives on mistakes, errors and failure in and across cultures, in order to provide a comprehensive view of contemporary research and practice which is accessible to researchers and practising professionals internationally.

Mistakes or errors can, at the individual level, cause deep shame and embarrassment and can lead to severe personal, organisational and collective crises. However, they can also be viewed as a resource for self-development and organisational, col-

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In this book, the authors explore:

1. The handling of mistakes, errors and failure from different cultural perspectives.
2. Practical approaches to mistakes, errors and failure across cultures including models for working with mistakes, errors and failure in self-reflection, therapy and counselling as well on the individual, organisational and political level.
3. Mistakes, errors and failure as constructs which are seen as part of the human condition. The authors of this book aim to view all three concepts from a perspective which aims to highlight their positive functional aspects.

1.2 Defining Mistake, Error and Failure

Interestingly, there are no generally accepted definitions of the terms “mistake”, “error” or “failure”. Even scientific studies that deal with error prevention or error management in very different contexts often do so without a clear definition of the term. Nevertheless, in our view, having definitions or at least approximations of these terms is indispensable. What is regarded as a mistake, error or failure differs in the various disciplines; therefore, we approach the concepts from multiple scientific viewpoints. These are partly supplemented and deepened in the chapters of the book by additional scientific perspectives.

The definitions of mistake, error and failure are diverse and inconsistent. Some selected perspectives on these terms will be presented here. On one hand, they are fundamental approaches and points of view for research and scientific discourse; on the other hand, they are definitions of terms that are significant and relevant for the disciplines discussed in this book.

Generally, we understand:

- “Mistake” as a deviation from a norm or a standard
- “Error” as a wrong assumption, idea or behaviour
- “Failure” as lack of success in desired goals or values “due to complex situations and circumstances” (Mayer 2020; Chap. 26)

How individual scientific disciplines explain these terms in their respective contexts is examined in more detail below. The decisive factor in selecting disciplines

to appear in this book was that the discipline had made a particularly intensive and extensive examination of and elaborate research into the topic, for example, in medicine, aviation but also pedagogy. These discussions are reflected in the various sections of this book.

1.2.1 Defining Mistake from an Interdisciplinary Perspective

What is commonly referred to as a mistake is a deviation from a standard, code of conduct or other requirement that jeopardises or obfuscates the achievement of a goal (Reason 1990, 1995, 2005; Senders and Moray 1991; Bauer 2008; Glendon et al. 2006).

Morgenroth and Schaller (2010, p. 1) extend this from a *psychological perspective* to the idea that, like failure, mistakes can only occur in the context of goal-orientated behaviour and constitutively involve the non-achievement of a goal or partial goal. In contrast to failure, one would speak of a mistake only if it was potentially avoidable.

According to Zapf et al. (1999), three criteria must be met for a mistake to exist:

1. Mistakes occur only in goal-orientated behaviour.
2. They mean the failure to achieve a goal or sub-goal.
3. Mistakes are potentially preventable.

This is confirmed in many psychological studies by Frese and colleagues (Frese 1993; Frese and Keith 2015). For example, when working with the computer:

> Mistakes can only be made by humans, because machines have no intentions … a mistake involves not reaching a certain goal and actually making it better. The latter is particularly problematic because it suggests blaming: those who make a mistake are often considered guilty. At least they are looking for a culprit: scientifically speaking, that does not make sense, because in reality the mistake is always due to a non-adaptation or a mismatch. If for example, if a glass shatters, one can never fully determine if this was due to the fragility of the glass or the clumsiness of the person. Both factors must work together so that it can break. (Frese 1993, p. 96, translated by Vanderheiden)

In the numerous experiments of systems psychologist Dietrich Dörner (1989) and engineering and medicine expert Bernhard Zimolong (1990; Zimolong and Trimpop 1993), the following errors have emerged, which are currently to be found in dealing with complex systems (Table 1.1).

Depending on the *language context* and on the understanding of the researchers, the terms “mistake” and “error” are often used synonymously in pedagogical contexts. In the German-language context, for example, in school research by Zander et al. (2014), the terms are used interchangeably. In other languages such as English or Spanish, a clear distinction may be made under certain circumstances (Chap. 20). A clearer nomenclature can be found in the language pedagogical perspective of second-language teaching. It will, according to Carl James (as cited by Kryeziu 2015), classically distinguish between various types, including:

Table 1.1 Types of mistakes (Vanderheiden based on Dörner 1989 and Zimolong 1990)

Mistake type	Example
Goal-setting mistake	An unrealistic goal is formulated and thus overloaded.
Assignment mistake	Decisions are made on the basis of prejudice or lack of information.
Forecasting mistake	Something is estimated wrongly, such as a required time window or required resources.
Mistake in reasoning	In the form of misjudgement in a hypothesis or experiment.
Recognition mistake	It is not recognised that a food is no longer edible.
Automation mistake	A slip, switching lanes in traffic.
Selection mistake	In the selection of stuff members, selection of partner or partner choosing a wrong product while shopping.
Memory and forgetting mistakes	During learning processes, when passing on information.
Judgement mistakes	A situation is wrongly judged.
Habitual mistakes	You drive a familiar route, forgetting to deviate slightly to run a particular errand.
Mistake by omission	Forget to fill up with petrol just before the car runs dry.

> *Slips* or lapses of tongue, pen and these can be detected and self-corrected. Then there are *mistakes* which can be corrected by their agent if the deviance is pointed out to the speaker. The third group are *errors* that cannot be self-corrected until further input has been provided to the learner to be able to correct that error. (Kryeziu 2015, p. 397)

Gartmeier (2009, p. 11) chooses a much broader approach to define mistakes as avoidable deviations from existing norms, which on one hand can never be completely eradicated but on the other hand represent significant opportunities for the initiation of learning activities (Gruber 1999, as cited in Gartmeier 2009, p. 11).

Various authors conclude that mistakes therefore can be regarded as useful starting points for individual competence development as well as for organisational innovation activities (Cannon and Edmondson 2005; Harteis et al. 2008; Harteis et al. 2006, translated by Vanderheiden).

Mistakes can describe actions as well as the results of actions. These may be deviations from context-specific, action-relevant action goals or objectives (Senders and Moray 1991; Gartmeier 2009, p. 17). In this case, a mistake can equally be seen as the omission of an action that would have been necessary in a certain situation (Meurier et al. 1997). At the same time, mistakes are not facts that can be objectively determined, but are judgements dependent on the validity of certain rules within a context (Reason 1990). These rules can exist in many different forms and degrees of explicitness and are adopted in the course of social negotiation processes (Heid 1999, cited in Gartmeier 2009, p. 17). However, mistakes offer opportunities for learning and enable awareness of potential deficits in one's own knowledge or action, which helps to identify appropriate fields of learning. Studies by Zander et al. (2014, p. 206) demonstrate that constructive handling of mistakes has a positive effect on the success of learning processes, reduces the fear of making mistakes and promotes a positive orientation towards learning from mistakes. Important factors in this context appear to be collaborative peer networks and the individual

involvement of students in this structure, especially when linked to the experience of high general self-efficacy.

In the Institute of Medicine's publication "To Err is Human: Building a Safer Health System" (Kohn 1999) published in 1999, the terms "mistake" and "error" are used synonymously. This publication has substantially increased the attention paid to *errors and mistakes in health care*—especially in the USA and the UK (see also discussion in Schrappe 2015, p. 6 and Brommundt 2018, p. 170; Chaps. 15 and 28).

Many current medical studies prefer to use the term "error" (see next paragraph), although Kistler, Walter, Mitchell and Sloane (2010, p. 3) explicitly state that: "The term 'mistake' was chosen over 'medical error' as other studies have demonstrated patients' confusion around the term 'medical error' ". In their research, Kistler et al. (2010) identify mistakes as diagnostic and treatment mistakes. However, they do not offer a clear definition of the term, but instead derive error characteristics from the feedback of their study participants in order to come to the two relevant categories, i.e. mistakes in diagnosis and treatment.

These figures are quite impressive: in 2017 alone, a total of 13,519 suspected errors were reported by patients or doctors to the relevant conciliation body of German health insurance funds (Medizinischer Dienst des Spitzenverbandes Bund der Krankenkassen e.V., [MDS] 2018). An error is understood to mean that a treatment was not carried out appropriately, carefully, correctly or on time (treatment error). The term covers different types of medical misconduct: for example, if necessary medical treatment is omitted or carried out with insufficient care, an error in treatment is present, and also when, for example, an operation is performed which was not individually indicated. All areas of medical care—from examination, diagnosis, clarification to therapy and documentation—can be affected by a treatment error (MDS 2018, p. 6). Although this figure is already high, further scientific research suggests that the number of actual errors in medical treatment greatly exceeds the number of resulting allegations by a multiple of five ("litigation gap"). The so-called litigation gap describes the fact that only 3% of patients have an unwanted event clarified (Schrappe 2015). In this context, Schrappe (2015, p. 140) makes the following distinction important: there are undesirable events which must meet three conditions:

- The event is negative for the patient.
- It is treatment-related (and not the course of the disease).
- It occurs unintentionally.

A distinction is made between an avoidable unwanted event that can be traced back to an error—in the sense of a rule violation—and legal terms such as "treatment error" where, in addition, the lack of care can be proven according to the service term (Schrappe 2015, p. 26), and the term "misuse", which describes treatment methods that cause avoidable damage or where the damage potential exceeds the respective benefit (Schrappe 2015, p. 26).

In addition to the medical field, in certain *technical domains*, research regarding mistakes is intensive, as mistakes can have particularly far-reaching, often even fatal

consequences, for example, in space research, aviation or traffic research (Helmreich 2000; Hagen 2018). Since the term “error” is predominantly used here in the international arena.

1.2.2 Defining Error from an Interdisciplinary Perspective

> Errors are not easily defined. (Senders and Moray 1991)

In the following section, we present different approaches to the term and concept of “error”. We follow different disciplinary perspectives which have predominantly researched errors and taken them into account, such as psychology, organisational psychology, medical sciences, pedagogical and technically orientated sciences.

From a *psychological perspective*, error has been generally defined in the APA Dictionary of Psychology (2019) as “a deviation from true or accurate information (e.g., a wrong response, a mistaken belief)”. From a psychological perspective as well, Rasmussen (1982, 1997; referring to it Grote 2018; Carroll 2018; Klement 2018) highlights the difficulty of providing a satisfying definition of human error, as it is often only retrospectively identified as such. For example, in terms of human–machine interaction, a system that functions less satisfactorily than normal owing to a human action or disorder that could have been counteracted by a reasonable human action is likely to be identified as human error. In the case of systematic or frequent miscasts, the cause is usually considered to be a constructional error. Occasional malfunctions are typically classified as system failures or human errors due to variability in part of the system or as man-made.

Rasmussen (1982, 1997) therefore strongly advocates seeing human variability as an important part of adaptation and learning. The human ability to adapt to the peculiarities of system performance and to optimise interaction is, in his view, the real reason that humans are in a system. In order to optimise performance and develop smooth and efficient skills, this author considers it crucial to have the ability to conduct experimental and error experiments and to regard human errors as unsuccessful experiments with unacceptable consequences (Rasmussen 1982, p. 3).

As constitutive of the error concept, Rasmussen (1982, p. 6) considers that:

> [e]rrors are related to variability of force, space or time coordination. The rule-based domain includes performance in familiar situations controlled by stored rules for coordination of subroutines, and errors are typically related to mechanisms like wrong classification or recognition of situations, erroneous associations to tasks, or to memory slips in recall of procedures. Since rule-based behavior is used to control skill-based subroutines, the error mechanisms related to skill-based routines are always active. Rule-based behavior is not directly goal-controlled, but goal oriented, and the immediate criteria for errors deal with whether the relevant rules are recalled and followed correctly or not. This is the case, unless the total task is considered explicitly as one integrated whole and ultimate error correction is included in the error definition.

Against this background he has developed a model for the classification of errors and their management, a model with a distinction between three levels of behaviour:

Table 1.2 Model for the classification of errors and their management with a distinction between three levels of behaviour (Vanderheiden based on Rasmussen 1982, p. 6)

Level of behaviour according to Rasmussen	Examples	Definition of error type
Skill-based performance	This is about errors in the context of certain sensory-motor coupling mechanisms in automatically running procedures, e.g. for experienced motorists, switching, flashing, etc. are largely automated.	Errors are related to variability of force, space or time coordination.
Rule-based performance	This is about errors in rather regular, schematic behavioural contexts such as simple turns at a crossroads or opening a document on the computer.	Criteria for errors deal with whether the relevant rules are recalled and followed correctly or not.
Knowledge-based performance	These are errors in more complex contexts or new unfamiliar actions, e.g. finding your way around a foreign city or setting up a new cell phone.	Errors in this domain can only be defined in relation to the goal of the task, and generic error mechanisms can only be defined from very detailed studies based on verbal protocols which can supply data on the actual process.

skill, rule and knowledge-based performance which is still an indispensable part of the current scientific discourse (see Goodman et al. 2011; Brüggemann 2009, p. 132) (Table 1.2).

In addition to these three types of errors, Rasmussen identifies errors of discrimination, referring to error mechanisms which are related to failure in selecting the proper level of behaviour in an abnormal situation (Rasmussen 1982, p. 7).

Reason's definition is still one of the most frequently used in the research literature on mistakes and errors. As referred to by Frese and Keith (2015), Carroll (2018), Edmondson and Verdin (2018), Lei (2018) and Glendon et al. (2006), Reason (1990, p. 9) defines human error as:

> a generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve its intended outcome, and when these failures cannot be attributed to the intervention of some chance agency.

Following Reason (1990), Frese and Keith (2015, p. 664) point to an important difference between active and latent errors. Latent errors are associated with weak or omitted organisational defences and are related to management decisions, security procedures, organisational structure and cultural factors:

> [The] harmful consequences [of latent events] can rest for a long time, which only becomes apparent when they are combined with active errors and local triggers to break through the many defense mechanisms of the system. (Frese and Keith 2015, p. 664)

Examples given by Reason are the catastrophe of Bhopal (Reason 1990) and the death of mountaineers on Mount Everest (as cited in van Dyck et. al).

From an *organisational psychological perspective,* Goodman, Ramanujam, Carroll, Edmondson, Hofmann and Sutcliffe (2011, p. 151) distinguish organisational errors as a construct that differs from errors at the individual level. They understand errors to be essentially unintentional deviations from rules or procedures (e.g. non-verification of drugs prior to administration to patients, non-compliance with safety guidelines in a coal mine) that can lead to negative organisational results. Goodman et al. (2011) assume that mistakes can affect various aspects of our lives, such as physical security, the economy, the environment and the political domain. According to their research, individual and organisational errors differ fundamentally. Because an organisational error is constitutive, the structures and processes that have caused multiple people within an organisation to participate in that common behavioural pattern or deviation need to be analysed and identified. By contrast, individual errors indicate action deviations of a person that differ from the actions of other people within the organisation. Individual factors in particular must be taken into account for error analysis. Goodman et al. (2011) understand "organisational errors" to mean the behaviour of several organisational participants which deviates from the rules and procedures laid down in the organisation which can therefore potentially lead to negative organisational results. The conclusion reached by Goodman et al. (2011) is that the errors are essentially reflected in several organisational aspects. On one hand, they represent unintended deviations from the expectations of the organisation with regard to adequate methods for carrying out work activities. Second, they could be deviations at the action level of several persons who act in their formal organisational roles and work towards organisational goals. Third, the deviations may potentially lead to negative organisational outcomes, and finally, such deviations may be primarily attributable to organisational conditions (i.e. they cannot be explained solely by reference to specific characteristics of individuals). Thus, an organisational error differs from an individual error that occurs in an organisational context (Goodman et al. 2011, p. 161).

Frese and Keith (2015) choose a slightly different approach to errors in the organisational context and describe them as unintended and potentially avoidable deviations from the objectives and standards set by an organisation, which may have either negative or positive organisational consequences (this is essentially also confirmed by Frese and Keith 2015; Hofmann and Frese 2011; Lei et al. 2016; and Frese and Keith 2015, as cited in (Lei 2018, 2)). Also Giolito and Verdin (2018, p. 68) point out specific organisational errors which are:

> a double deviation from (a) organizationally specified rules or norms of action and (b) the organization's objectives and goals.

Frese and Keith (2015) emphasise the existence of so-called "latent" errors, which remain unrecognised and often show their consequences only in the medium or long term (see also Ramanujam 2003). Furthermore, Giolito and Verdin (2018, p. 69) offer an additional differentiation between lower- and higher-order errors, which essentially differ as follows:

> Lower-order errors refer to deviations from clear and concrete rules and norms. Higher-order errors refer to situations in which an organizational rule itself is 'wrong,' that is, it deviates from higher principles, which may range [from] legal principles to commonsense rules including safety of people and organizational survival.

In organisational contexts, strategic mistakes are often spoken of. These are usually high-order errors, even if they have begun at the low-order level. A characteristic feature of a strategic error is that it affects the strategic level of the organisation, i.e. its goals, resources and competitive advantages, but can also relate to strategic decisions such as those of the management and can also affect errors that may have initially arisen at a lower hierarchical level but then have consequences for the entire organisation or large parts of it (Giolito and Verdin 2018, p. 69).

Edmondson and Verdin (2018, p. 83) add further aspects of organisational errors that:

- Concern the actions of multiple organisational members
- Have the potential to result in adverse organisational outcomes
- Represent unintended discrepancies from goals and expectations
- Carry a risk of harm
- Are caused by organisational conditions such as rules and values.

Various authors distinguish an organisational error from an error that an individual makes in an organisational context, in that an organisational error is not caused by idiosyncratic characteristics of one or more persons (Russo and Schoemaker 1989; Kahnemann 2013; Roxburgh 2003), but results from the conditions existing in the organisation (Goodman et al. 2011). Organisational errors are not the result of simple human misconduct, but can be traced back to organisational conditions, policies and strategies (Edmondson and Verdin 2018, p. 83).

From a *medical point of view*, the notion of "error" is quite diverse, as noted by Elder et al. (2006), in a study examining the understanding of this term. Physicians have been asked to report errors from primary care, but little is known about how they apply the term "error". The study by Elder et al. (2006) qualitatively assessed the relationship between the variety of error definitions found in the medical literature and physicians' assessments of whether an error occurred in a series of clinical scenarios. Through qualitative analysis, Elder and colleagues found that three approaches may affect how physicians make decisions about error, namely, the process that occurred versus the outcome that occurred, rare versus common occurrences and system versus individual responsibility.

Rogers, Griffin, Carnie, Melucci and Weber (2017, p. 1) agree that there is no common understanding of the term "error" in the medical context. This is a critical problem with regard to the reporting of errors. Rogers et al. (2017, p. 1) identify human error, risk behaviour and reckless behaviour as relevant to error development, in that:

> [h]uman error involves unintentional and unpredictable behavior that causes or could have caused an undesirable outcome. Often there are faults within the system that allow the error to occur.

Table 1.3 Four error types (Vanderheiden based on Elder 2004, p. 128)

1	Office administration errors	Missing charts, laboratory or radiograph processing errors
2	Physician-related errors	Skill problems, time management problems (interrupted, feeling rushed)
3	Patient communication errors	Problems communicating with patient by physician, staff or other physicians; appointment and triage errors
4	Preventable adverse events	Missed diagnosis, misdiagnosis, delayed treatment, incorrect treatment

In the medical context, Elder (2004) substantiate this, identifying four types of error as indicated in Table 1.3.

As previously noted, the most basic definition goes back to Reason (1990) who defines errors from a *pedagogical perspective* (Chap. 18).

Also at the beginning of the 1990s, Senders and Moray (1991) correctly pointed out that such an understanding presupposes a normative dimension of error, insofar as an error can only be recognised as such if a norm does not cover this deviation (Harteis et al. 2008).

On the other hand, James (1998) observes a crucial difference in the context of language learning since error cannot be self-corrected, while mistakes can be self-corrected. According to James (1998, p. 78), who carried out significant basic research in this field, to which reference is still made today (see Kryeziu 2015; Amara 2019) a very clear distinction occurs between mistake and error:

> if the learner is inclined and able to correct a fault in his or her output, it is assumed that the form he or she selected was not the one he intended, and we shall say that the fault is a mistake. If, on the other hand, the learner is unable or in any way disinclined to make the correction, we assume that the form the learner used was the one intended, and that is an error.

Following this definition, in the context of language learning, an error is considered a deviance or discrepancy between what a learner tends to say and what a native speaker tends to say. According to James it is constitutively for errors that errors cannot be self-corrected until further input has been provided to the learner to be able to correct that error.

From another *pedagogical perspective*, Gartmeier (2009) defines errors even more broadly, as avoidable deviations from valid norms, which, although never completely eradicable, on the other hand represent significant opportunities for the initiation of learning activities. Gartmeier (2009) understands the concept of error as being applied to actions as well as the results of actions. He refers to deviations from context-specific or situation-specific relevant action goals (Senders and Moray 1991). Not only an action itself but also the renunciation of an action that would have been necessary in a certain situation can also be an error or a potential error (Meurier et al. 1997). It must be taken into account that errors are not objectively ascertainable facts, but are judgements that depend on the validity of certain rules in a context (Reason 1990). These rules can exist in various forms and manifestations

and are located within the framework of social negotiation processes (Heid 1999; Gartmeier 2009, p. 17).

Amini and Mortazavi (2013, p. 1) (Chap. 28) point out:

> There is a certain component of risk in everything we do. Its relevance is based on the testimony that mistakes are inevitable in complex organizations. Errors can result in negative consequences (e.g., loss of time, faulty products) as well as in positive ones (e.g., learning, innovation).The scientific understanding of the negative effects of errors is much better developed than that of the potential positive effects of errors. Most of the research has supported the concept of error prevention—the effort to block erroneous actions whenever possible. The potential long-term positive consequences of errors, such as learning, innovation, and resilience, however, are less obvious, although people readily agree that they can learn from errors.

In a large-scale study involving aviation crews from 26 nations on 5 continents, Helmreich et al. (2000) have looked at error research in the *technical context* of aviation (Chaps. 30, 31 and 32). They point out that human error is a relevant critical factor in aviation, as it is in other sociotechnical fields such as space travel and medicine. Error is understood in this context:

> as action or inaction that leads to deviation from crew or organizational intentions or expectations (Helmreich et al. 2000, p. 6)

and is divided into five categories as shown in Fig. 1.1.

From a *technical-philosophical perspective*, Kiassat (2013) approaches the topic by touching on questions of automation, asserting that since all individuals are unique in their characteristics, it must be assumed that logically their positive and negative contributions to the performance of a system also differ. Therefore, Kiassat (2013) concludes that in any system that is not fully automated, the effect of the human participants must be taken into account if performance optimisation of a

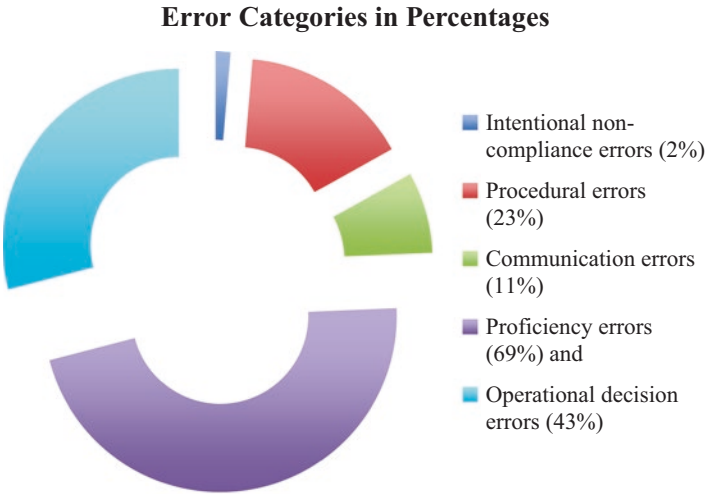

Fig. 1.1 Five categories of errors (Vanderheiden based on Helmreich 2000, p. 7 & p. 9)

system is intended. Although humans are intelligent, adaptable and adaptive, on the other hand—according to the author—they are also prone to error:

> Therefore, in situations where human and hardware have to interact and complement each other, the system faces advantages and disadvantages from the role the humans play. It is this role and its effect on performance that is the focus of this dissertation. (Kiassat 2013, p. 23)

This approach led Kiassat to understand "error" to mean "the incorrect performance of an operator as required for a particular task" (Kiassat 2013, p. 23). However Glendon, Clarke and McKenna (2006, p. 153) place less emphasis on the inevitability of making errors than on the necessity and positive implications of mistakes, affirming that:

> Errors are essential for learning because of the feedback that they provide and evidence suggests that we learn best if we are allowed to make errors.

1.2.3 Defining Failure from an Interdisciplinary Perspective

Having reviewed the terms "mistake" and "error", we now focus on the term "failure" and the meaning of the concept from different disciplinary perspectives.

Psychology (see Morgenroth and Schaller 2010, p. 1) understands failure as being unsuccessful in a special situation, failing to accomplish a task or being unable to achieve a desired goal, and understands it as a basic human experience that occurs in everyday activities as well as in longer-term projects in the context of personal development. Morgenroth and Schaller (2010) stress that failure is associated with a special tragic moment or event when it becomes clear to all involved that a person, group or organisation has missed a goal, for instance, termination at work, a failed relationship or the bankruptcy of a company. The unambiguity, but also the insight into the necessity of failure, can often only be experienced or realised afterwards (Morgenroth and Schaller 2010). This results from the fact that here it is primarily a question of context-bound subjective assessments and usually not of objective facts (Morgenroth and Schaller 2010, p. 3, translated by Vanderheiden).

According to these authors, the everyday usage of the concept of failure implies:

1. That there is a clearly defined goal
2. That objective criteria are available for assessing the success of the action
3. That the judgement is independent of the judgement or judgement context.

Morgenroth and Schaller (2010) emphasise that all three assumptions are problematic from a *psychological viewpoint* and suggest that judgements about success and failure are highly relative. Accordingly, these authors regard the common definition of failure as questionable from a scientific psychological perspective for the following reasons:

1. Targets are often ambiguous and not specifically defined. Furthermore, more than one indicator or criterion is often relevant in terms of target achievement, e.g. in terms of career success.
2. In judging success and failure, there is often a problem in obtaining objective yardsticks to evaluate outcomes that justify such a verdict. This measurability is dependent on the subject of the action and can greatly differ individually, for example, in judging when a relationship is considered by the parties to be failed.
3. Judgements are tied to the concrete context of judgement. This includes, for example, the perspective given by the individual who judges. This relativity is already clear in the fact that failures from the point of view of the actor are valued differently from the observer's viewpoint. This phenomenon is known in psychological attribution research as an actor–observer difference.

In addition, Morgenroth and Schaller (2010) highlight that the failure assessment may additionally depend on whether the person concerned is currently living through a life crisis (Chap. 2) or if stronger sanctions are to be expected. Furthermore, in line with Backert (2004), they stress that failure judgements are embedded in a cultural context that influences the social consequences of failure. Backert (2004) contends that, on the basis of economic failures in Germany compared to the USA and Japan, failure is assessed more negatively and is penalised with stronger sanctions.

Relevant factors here appear to be fear of failure and success orientations, which are interrelated and interact in many ways (see Martin and Marsh 2003; De Castella et al. n.d.). Martin and Marsh (2003) have classified three types of failure in terms of people's attitude towards failure: those who are success-orientated, those who are fail-avoidant and those who accept failure.

According to Martin (2012, p. 1), it is also important to distinguish between ways of handling failure, namely, between:

1. Students who deal with their fear of failure by hard work and/or success (referred to as over-strivers and sometimes as perfectionists)
2. Students who deal with their fear of failure

Meanwhile, many authors (Chaps. 2, 11, 12, 16, 18, 23, 26, 27, 28) emphasise that, as with errors, failure should be attributed with a positive function. In contrast or in addition to this, a positive consideration and evaluation of failure experiences not only optimises the regulation of action in a more or less limited area but is also about the personality as a whole, for example, concerning a person's values, goals, attitudes, self-concept and prospects for future self-development.

Sociology, too, is based on a rather broad understanding of failure. Ackroyd (2007, p. 3306) defines failure in terms of organisational contexts:

> By organizational failure is usually meant failure against some measure of performance, or failure to achieve a goal that is normally expected … But failure to perform against particular criteria is a customary or legal definition of failure, and may or may not indicate that there is some more fundamental problem of organization. Many writers on management have conveniently conflated the distinction between measured and substantive organizational failure.

Hans Braun (n.d.) first notes that failure is constitutively part of being human: "failure is part of the human condition" (Braun n.d., p. 38, translated by Vanderheiden) and correctly points out that failure is sociological perspective has many manifestations. First of all, he distinguishes failure from defeat, in that failure:

> affects the people or institutions concerned more or less essentially. (Braun n.d., p. 29)

People can fail in themselves and in the circumstances in which they act; they can also fail in relationships or in systems. In addition, a failure of the system itself is conceivable, for instance, in politics and economics (Braun n.d., p. 32). From a *sociological perspective*, this can be considered positive and systemically inherent, because failure of political processes in systems in which citizens participate in decision-making directly or through their elected representatives is not only inevitable but also in a positive sense can be seen as an expression of the functioning of democracy (Braun n.d., p. 32). The author goes even further in his positive assessment of failure when discussing the economic sector. Here, Braun (n.d., p. 32) assumes that it is appropriate for companies to fail if they do not produce cost-effectively or if they ignore customer preferences, because this is part of the nature of the market economy and constitutes its strength.

In addition to the individual and organisational dimension when dealing with failure processes, the cultural context is of particular importance:

> After all, cultural frameworks play a role in the processing of failures. It makes a difference whether people fail in an environment where everything depends on not losing their prestige, or whether this happens in an environment where failure, leaving personal relationships out of consideration, is an inevitable downside to being positively risk-tolerant and as a basis for a reboot. In this context we talk about "cultures of failure". (Backert 2004, p. 35 as cited in Braun, translated by Vanderheiden)

Braun emphasises another interesting dimension of failure, namely, the public. This is certainly the case in the context of economics and politics in a special way, as well as in reputation-related failure, such as in sports or science (Braun n.d., p. 37), but can also play a role in private contexts in many countries, such as in divorce proceedings, which people often experience as massive failures (Chaps. 2 and 12).

From *a medical research perspective*, Lingard et al. (2004, p. 332) distinguish four types of failure:

1. Occasion failures: Problems in the situation or context of the communication event
2. Content failures: Insufficiency or inaccuracy apparent in the information being transferred
3. Audience failures: Gaps in the composition of the group engaged in the communication
4. Purpose failures: Communication events in which purpose is unclear, not achieved or inappropriate

Table 1.4 Differences characteristics: mistake, error and failure

Mistake	"Mistake" can be applied to actions as well as the results of actions (Gartmeier 2009, p. 17).
	Mistakes may be deviations from context-specific, action-relevant action goals or objectives (Sender & Moray, 1991, as cited in Gartmeier 2009, p. 17).
	Mistakes are not facts that can be objectively determined, but are judgments dependent on the validity of certain rules within a context (Reason 1990, as cited in Gartmeier 2009, p. 17).
	These rules can exist in many different forms and degrees of explicitness and are adopted in the course of social negotiation processes (Heid 1999, as cited in Gartmeier 2009, p. 17).
	Mistakes offer opportunities for learning and enable awareness of deficits in one's own knowledge or action (Gartmeier 2009, p. 17).
	Mistakes are a deviation from a standard, code of conduct or other requirement that jeopardises or frustrates the achievement of a goal (Morgenroth and Schaller 2010).
	They occur only with purposeful behaviour and involve the failure to reach a goal or sub-goal (Morgenroth and Schaller 2010).
	The omission of an action that would have been necessary in a particular situation can equally be described as a mistake (Meurier et al. 1997).
	A mistake is potentially preventable (Morgenroth and Schaller 2010).
	Mistakes are performance-related and may occur even though a learner has the knowledge from a system safety perspective; it is important to report and learn from both errors and mistakes (Nassaji 2018, as cited in Chap. 30).
	A behaviour mistake describes a behaviour which is wrong in the current cultural environment and circumstances (Chap. 32).
	Mistakes have in common that an alternative behaviour would be preferable in each case and those responsible could have known or done it better. There are objective and technical mistakes, mistakes of estimation, strategic mistakes and moral mistakes (Chap. 15).
	They occur only with purposeful behaviour and involve the failure to reach a goal or sub-goal (Morgenroth and Schaller 2010).
Error	An error is a deviation from true or accurate information (APA Dictionary of Psychology 2019).
	It is related to variability of force, space or time coordination (Rasmussen 1982).
	Error involves unintentional and unpredictable behaviour that causes or could have caused an undesirable outcome (Rogers et al. 2017).
	Errors are "unintended—and potentially avoidable—deviations from organisationally specified goals and standards" (Frese and Keith 2015, as cited in Lei 2018, p. 2).
	Errors are avoidable deviations from valid norms, which, although never completely eradicable, on the other hand represent significant opportunities for the initiation of learning activities (Gartmeier 2009).
	An "error" is based on the premise that rules or regulations are incorrectly applied or executed, especially in an industry that is considered highly regulated. Errors are thus defined as deviations that are competence-based and occur as a result of a lack of knowledge (Nassaji 2018, as cited in Chap. 30).

(continued)

Table 1.4 (continued)

	Errors are defined as "mistakes" and can occur for different reasons, such as a result of ignorance, a personal decision or preference, a habit, forgetfulness, lack of awareness or similar psychological issues (defined in reference to Love et al. 2009, by Mayer and Mayer in Chap. 8).
	From a forensic point of view, four types of terror must be distinguished: practitioner error (refers to human error that may be related to negligence or incompetence), instrument error (occurs when instruments or technologies fail), statistical error (refers to an error in the algorithms used by the device providing the measurement) and method error (refers to limitations that have nothing to do with practising error and therefore would not be related to cognitive errors such as metacognition) (Chap. 25).
Mistakes and Errors	Mistakes can be understood as the most general term used in everyday situations, whereas error is more suitable for formal contexts. In addition, the term "error" might even be considered as more severe than a mistake. Mistakes can be thought of as accidental happenings, while errors are made due to a lack of knowledge, for example, not knowing the fitting answer to a question or the way of performing adequately (Chap. 29).
Failure	"Failure is part of the *conditio humana*" (Braun n.d., p. 38).
	Failure means failing some measure of performance, or to achieve a goal that is normally expected (Ackroyd 2007).
	Failure is the intended or use of a wrong plan to achieve an aim (Kohn et al. 1999).
	Failure is expected to occur only with purposeful behaviour and involves the failure to reach a goal or sub-goal (Morgenroth and Schaller 2010).
	It depends on individual judgement (Morgenroth and Schaller 2010).
	Failure can be influenced by the fact that a person is in crisis (Morgenroth and Schaller 2010, p. 2).
	Failure judgements are embedded in a cultural context that influences the social consequences of failure (Backert 2004).
	Failure is the result of individual poor decision-making or the consequence of personal misconduct (Chap. 2).
	Failure refers to a lack of success in communicating and/or in building relationships. Failure in intercultural communication situations combined with erroneous ascriptions of identity classification can easily lead to a failure in building trustful intercultural employee–client relationships (Chap. 8).
	Failure can be understood as a particular communicative and relationship-building activity (modelled after Lingard et al. 2004) which lacks success in communicating and/or building relationships with regard to a specific topic or content (Chap. 26).
	A "moral failure" is not a lapse in decorum or social practice. One sense of the term is as the equivalent of deliberate wrongdoing. There are certain forms of behaviour that are viewed, across cultures, as gravely damaging to individuals or the group, such as treason, murder, slavery, rape. These capture key moral boundaries that guide human life. Such come under the umbrella of the Universal Declaration of Human Rights to which every adult and child without exception is entitled (Chap. 16).

From an *engineering and philosophical perspective*, failure can be defined as:

> [t]he condition when the machine is unavailable for production due to an unplanned event. Within the context of failures caused by the operators, failure is the consequence of any operator-related mistake that takes the machine out of production. (Kiassat 2013, p. 23)

Table 1.4 summarises important differences between the terms "mistake", "error" and "failure" on the basis of the previous statements in this section.

1.3 Dealing with and Attitude Towards Mistakes, Errors and Failure

In most scientific studies and discourses, it is assumed that mistakes, errors and failure are unavoidable and negative. Ultimately, however, the question is not how to avoid them, but how to manage mistakes, errors and failures constructively and use them as resources (van Rooij 2015). The spectrum ranges from the most diverse methods of mistake or error prevention, to error management, to methods of error correction and to concepts of error-friendliness.

Frese (1993, p. 4) also considers mistakes and errors to be unavoidable—a consequence of the fact that humans are able to quickly integrate information into their thought and action system and to remain able to act in the face of uncertainty. In his studies in connection with the use of computer programs, Frese (1993, p. 4) found that, interestingly enough, experts make more mistakes than newcomers but at the same time discover and correct these errors more quickly. Against the background of the inevitability of errors, Frese (1993) and his colleagues instead of for the original concept of error management meanwhile for a concept of error avoidance.

Error management is prescriptively defined by Frese (1993, p. 4) as:

> a meaningful approach to an error with the goal
>
> - to avoid further errors or mistakes,
> - that the negative effects of errors do not arise, and
> - the consequences of errors can be quickly eliminated.

Amini and Mortazavi (2013) consider error management to be critical, observing that error prevention also potentially stops certain long-term positive effects of inevitable errors. These authors note that scientific understanding of the negative effects of errors is much better developed than that of the possible positive effects of errors. As a result, most of the research has been devoted to the concept of error avoidance in an attempt to prevent erroneous actions as far as possible. Amini and Mortazavi (2013, p. 1) advocate a greater focus on the potential long-term positive consequences of errors such as learning, innovation and resilience, even if these are less obvious.

Grout (2006, p. 1) also comments critically on the concept of error management and advocates the introduction of what he sees as the wider concept of mistake proofing, known by its Japanese slang buzzword as "poka-yoke":

> Mistake proofing uses changes in the physical design of processes to reduce human error. It can be used to change designs in ways that prevent errors from occurring, to detect errors after they occur but before harm occurs, to allow processes to fail safely, or to alter the work environment to reduce the chance of errors. Effective mistake proofing design changes should initially be effective in reducing harm, be inexpensive, and easily implemented. Over time these design changes should make life easier and speed up the process. Ideally, the design changes should increase patients' and visitors' understanding of the process. These designs should themselves be mistake proofed and follow the good design practices of other disciplines.

The author recommends mistake proofing since, from his point of view, it also includes the improvement of the work environment and helps in detecting mistakes, preventing mistakes and preventing the influence of mistakes.

Gartmeier (2009, p. 14), on the other hand, deals in particular with the concept of "error-friendliness" in his studies, in which a distinction is made between error-friendliness at the level of individual, error-related settings like attitude and error-friendliness in the sense of a knowledge-based ability to avoid errors. On the basis of the definition from von Weizsäcker and von Weizsäcker (1998, as cited in Gartmeier 2009, p. 19):

> [t]he concept of error-friendliness describes the attributes of biological systems that make it possible that system disturbances do not lead to their extinction, but that they can be used for their further development (von Weizsäcker and von Weizsäcker 1984, 1998). Organisms—as special forms of biological systems—have a variety of mechanisms that allow them to deal with negative environmental effects or to use them for their development.

This feature of error-friendliness can be an indispensable and central tool of human development. According to von Weizsäcker and von Weizsäcker (1984, as cited in Gartmeier 2009, p. 19), learning from mistakes, errors and failures helps to adapt to ever new environmental conditions and to solve the associated problems. In terms of learning from failure, mistakes plays a significant role (Chaps. 2, 11, 14, 16, 18, 23, 24, 26, 27, 28, 29, 30, 31, 32).

Von Weizsäcker and von Weizsäcker (1984, as cited in Gartmeier 2009, p. 20) point out in this context that, above all, long-term adaptation skills are necessary, at the level of cognitive structures, so that people can benefit from positive learning effects for further development.

Gartmeier (2009, p. 20) has been able to observe three aspects of error-friendliness in particular, which have proven particularly effective in this context:

1. A positive attitude towards mistakes
2. The knowledge-based ability to avoid mistakes and errors
3. Certain forms of experiential knowledge, especially negative knowledge.

A positive basic attitude to mistakes has been found to encourage people to show a greater willingness to act on their own initiative. This is important not only at the individual level of dealing with errors with regard to personal learning effects and further education but also on the systemic level. When certain errors are systemically conditioned, for example, if people are exposed to permanent demands or

dangerous situations, then proactive action is required to deal with these systemic-related grievances.

Von Weizsäcker and von Weizsäcker (1984) explain that, in order to understand perceptions of their environment as deviations from a certain norm, individuals have to resort to past, memory-based experiences. Consequently, error-friendliness is an important resource for the further development of cognitive structures, so that, for example, judgement in relation to relevant categories such as "dangerous" and "safe", "relevant" and "irrelevant" is developed, as well as new action strategies. The specific knowledge developed when learning from mistakes can be linked to the long-term positive effects of error-related learning processes in the competence of people in the most diverse contexts.

An important concept in this context is the so-called negative knowledge (originally researched by Minsky 1997, followed by Oser and Spychiger 2005 and Parviainen and Eriksson 2006, as cited in Gartmeier 2009, p. 22). Negative knowledge is experience-based knowledge of what is not to be done in a particular situation, for instance, not placing bare hands into boiling water. Negative knowledge can also refer to misconceptions or ideas that exist in a particular context, such as that someone in England or South Africa should under no circumstances drive on the same side of the road as they should in the USA or Germany. The concept of negative knowledge thus makes a connection between experiencing and learning from mistakes and individual knowledge. On the other hand, it allows the explanation of long-term positive effects of the acquired knowledge on the competence and performance of the individual (Gartmeier 2009, p. 22). In exploring the relevance of negative knowledge especially in regard to workplaces, Gartmeier (2009, p. 55) found that:

> [p]rofound changes bring about situations where relevant and applicable knowledge becomes obsolete and is turned into non-viable or expired knowledge. In such situations, an individual awareness about knowledge that is to be reconsidered or updated is a crucial factor in developing and maintaining professional competence. The more precisely individuals manage to detect lacks of relevant know-how as well as of outdated knowledge being still "in use", the better it should be possible to recognize what is to be learned.

Negative knowledge in this context offers various beneficial effects, because it:

1. Supports certainty in how to proceed
2. Increases efficiency during actions
3. Improves the quality and depth of reflection processes on action.

Negative knowledge can be considered as the outcome of learning from errors but at the same time can be seen as a special case of experiential learning, because error-related learning employs the construction of knowledge from episodic events. Gartmeier (2009) emphasises errors have the potential to challenge individual mental models and thereby enable modifications of these models. Search processes of modification can happen in different modes, such as through differentiation of the underlying model of action, through replacement of parts of the model or through

indexing false connections or weak areas within the model that bring about potential for errors which are relevant elements for the construction of negative knowledge.

Zander et al. (2014) emphasise that these norms are situation-specific or group-specific. The occurrence of errors can be an aversive affective experience. In their research, Spychiger et al. (2006) found that students can develop and be inhibited by fear of mistakes in learning or achievement situations if they assume that these could negatively influence their competences and abilities. This affective dimension of dealing with errors is fundamentally social in nature, since it implicitly involves an expected negative evaluation by others. On the other hand, Zander et al. (2014) were able to confirm that constructive handling of mistakes is conducive to successful learning processes and has both an affective and a cognitive dimension, which is reflected in a reduced fear of mistakes and a greater willingness to learn from mistakes.

These viewpoints can be supported by perspectives such as positive psychology, positive organisational psychology and positive scholarship which emphasise that aspects of positive and optimal functioning can significantly contribute to a positive handling of life situations and life and work challenges (see Seligman and Csikszentimihalyi 2000; Luthans 2002a, b; Luthans and Youssef 2007; Wong 2011). These are discussed in the following section.

1.4 Mistakes, Errors and Failure in the Context of Positive and Optimal Functioning Research

Several scientific approaches have affirmed that a positive and constructive viewpoint can change negative and challenging experiences (Seligman and Csikszentimihalyi 2000), such as mistakes, errors and failures. In order to deal constructively with mistakes, errors and failure from the perspective of positive and optimal functioning, it is crucial to overcome a destructive culture of error and transform it in favour of a constructive culture of error. Characteristic elements of a destructive error culture would be, for example, a threat or guilt culture (Löber 2012, pp. 232–238). Shame and shaming can also potentially be a component of this destructive culture of error if it is closely linked to fear and insecurity, misused as an instrument of power or not consciously used and perceived as a resource (Mayer et al. 2019). In order to use mistakes, errors and potential failure as a resource, a positive error culture is necessary and decisive. Important elements of such a culture can be a sense of security and support for learning from mistakes which opens spaces for experimental error-friendliness (Löber 2012, pp. 245–263; Frese and Keith 2015) as well as experimental possibilities (Gartmeier 2009, p. 126).

Within the concept of error-friendliness, the argument could be put forward that individuals with a pronounced tendency to experiment—whether mentally or in reality— get to know errors and dangers more playfully, thereby learning more about their own limitations and being in a better position to adapt to circumstances

that are new and dynamic for them. Löber (2010) adds an interesting consideration to this idea, namely, that all employees must experience fair dealings with each other in order to tackle relevant problems with confidence in the freedom from sanctions.

This corresponds with the research results of management researcher Amy Edmondson (2004), who investigated how factors at the group and organisational level affected errors in administering medications to hospital patients. Edmondson (2004) discovered the particular relevance of a certain social climate, in that the results from patient care groups in two hospitals showed systematic differences not only in the frequency of errors but also in the probability that errors were recognised and learned from by the group members. It appears that the error rates depended on at least two influences: actual errors (related to particularly sensitive areas such as intensive care) and the willingness of the members of a team to report errors. In addition, it shows that there were positive correlations between error rates and nursing manager coaching, perceived unit performance and the quality of relationships between team members. There were higher error rates in teams with better average values in coaching nurses, a higher relationship quality between the team members. Edmondson (2004) attributes this finding to the members' perception of how safe it was to report and discuss errors in their unit. The readiness to report a mistake correlates with the assumed perception of the members of a team that a mistake in their unit was not directed against them (Edmondson 2004, p. 79). In her conclusion, Edmondson (2004, p. 86) underlines the importance of dealing constructively with errors, especially in the context of creating a trustworthy social climate, because the way in which mistakes have been dealt with in the past, as well as which mistakes have been made or reported, contributes to a climate of fear or openness that can amplify itself and that sustainably influences the ability and willingness to identify and discuss errors and problems. Decisive factors are thus the experience of psychological security, which makes it possible to express oneself openly, but also to hold different opinions—a climate which allows mistakes to be corrected and potential risks to be discussed openly (Edmondson and Verdin 2018, p. 81). (Chaps. 27 and 28)

It is also important that a system allows for a diversity of perspectives, without this becoming too great. Dahlin et al. (2018) as cited in Frese and Keith (2015, p. 669) explain:

> Thus, people need to be at ease to report errors, but their perspectives also need to be different enough to detect errors. If all people see the same situation in a similar way as wrong or right, chances to detect errors are lower. If people are too different, it may be difficult to persuade others where the error lies.

According to this statement, a variety of different perspectives is important, not to create a "think tank" of the analysis of mistakes, errors and failures, but to support and broaden the understanding and analysis of mistakes, errors and failures from different cultural perspectives.

1.5 Mistakes, Errors and Failure Across Cultures

Given the particular significance of this topic, there is a void of research on mistakes, errors and failure from diverse cultural perspectives. Most research refers to a selected cultural context, the direct comparison between one or two different cultural groups, and to a very specific field of application such as aviation, a certain medical or technical field, or a form of organisation. Various new investigations and conceptual considerations are presented in this book, and the following explanations will therefore initially deal with general, overarching considerations and basic research.

We provide a brief overview of existing research which focuses on the topic of mistakes, errors and failure within and across different cultural contexts.

1.5.1 Differences in the Understanding of Failure in the Economic Context of Japan, the USA and Germany

Important basic work on this topic was done at the beginning of the millennium by sociologist Wolfgang Backert. Backert (2004) deals in particular with the understanding of failure in the economic context of Japan (Chaps. 14 and 19), the USA and Germany. He assumes that there is a basic consensus in Germany to discredit the person who failed in the truest sense of the word: they will no longer be trusted in the future; their credibility and creditworthiness in the broadest sense are gone and very difficult to restore (Backert 2004, p. 65). The mistake or failure is attributed to the person individually. Failure in Japan occurs at the level of a highly organised form of individual irresponsibility: owing to particular emphasis on the organisation which places the individual in the background, failure of an individual in the larger context is not possible, because the organisation is regarded as a priority. At the same time, this can be connected with the fact that in the event of a crisis, an individual takes on the "victim role" symbolically, so to speak, in order to save the honour of the organisation, thus earning the community—at least according to the internal logic of the organisation—a merit. This symbolic failure, in the form of assuming external responsibility, can have very far-reaching consequences in Japan, including suicide. Backert (2004, p. 65) goes on to explain that the American variant of understanding failure focuses on the process of how failure could occur. The danger for the social reputation is then not to have made an effort and to have failed less in this respect. Defeat in the USA usually offers the chance to try again and, this time, to do it better. When forming new teams, the practice of taking on a member who has already failed at precisely this point can thus demonstrate experience of defeat in this sector that seems completely absurd from a German point of view but that makes sense according to American opinion. According to Backert (2004, pp. 67–68), the individual attribution of guilt is

typical when dealing with mistakes or failure in the German context, possibly including public humiliation up to social death. For Japan, the author refers in the economic context to unilateralism, the organisation according to the *ie* principle (the company as a family, with clear hierarchies that are especially linked to seniority) and the far-reaching access of the company to the individual. According to this, processes of failure in such a context could actually have serious consequences for the failing individual, since ultimately this person is interwoven with the company, and the failure of the company consequently falls back on the individual. However, the principle of *uchi* and *soto*, by which in Japan the design of the organisational–environmental relationship is established, overrides exactly this point: *uchi* and *soto* describe, in essence, the separation of "inside" and "outside", "we and them" and "we against the others". The perception partly disintegrates into concerns which concern the company (the *ie*) in general and questions which concern the rest (the society). At this point failure becomes de facto impossible for an organisational member. The relevant structures within the organisation emphasise the internal cohesion; the social environment as a "judicial authority" in failure processes is largely ignored. It is important for the organisation to save face to the outside. A personalised form of guilt allocation, which actually falls back to the failing individual, does not result. Instead, according to Backert (2004, p. 69), in the Japanese model, responsibility is distributed among so many positions that it is not really possible to actually localise the person responsible: in case of doubt, the nominal top of the organisation assumes the duty of apology to the outside world, but above all this has a ritual function.

In contrast to the tendency towards personalisation and discrediting which can be observed in the German context, and the more ritualistic practice of assuming responsibility in Japan, Backert (2004, p. 71) describes failure as a chance for a new beginning as more typical for the American context than, for example, for the German context. The failure of a serious attempt is seen as an experience, broadening the horizon and not leading to the exclusion of the failed person. The reason for this is the notion that mistakes and experience of failure can be used as a resource to include someone in a team who has made certain mistakes or has failed in a particular context. This can mean that when a new attempt is made, precisely these wrong decisions can be avoided and can be adequately reacted to in advance. Backert (2004) cautions that this positive understanding of failure and making mistakes does not apply to everyone in the American context but only to those who "make an effort". This benevolent view does not apply to those who are unable or unwilling to do so, who are unable to adapt to this normative requirement (Backert 2004, p. 73).

Lewis et al. (2009, p. 1) come to similar conclusions in a study in which they observed the emotional responses to performance contexts of 149 preschoolers from three cultures. The children were Japanese (N = 32), African Americans (N = 63) and White Americans of mixed European descent (N = 54) (Chap. 19). The results showed that Japanese children differed from American children in that they expressed less shame, pride and sadness but more disclosure and evaluative embar-

rassment. African American and White American children obviously did not differ from each other. American children, however, showed more valuation as opposed to exposure of embarrassment. This finding supports the idea that success and failure are interpreted differently by Japanese children in the preschool years. The low level of sadness and shame expression and the limited number of different expressions observed in Japanese children agree with the general finding that East Asian infants and young children differ from Western infants and children mainly in the presentation of negative expressions. These results show that cultural differences, whether of temperament or direct socialisation of cultural values, influence how children respond to performance situations.

Lewis et al. (2009) found that differences could already be found in preschool children in their study, depending on the culture. They differed in the emotions expressed in response to failure and success and in the number of different expressions that appeared in response to failure. This suggests that cultural differences occur early, perhaps as soon as or shortly after the expression itself. In that study, culture was proven to be a factor that clearly influences the facial expression of emotions. Thus, small Japanese children showed less sadness and shame in response to failure and they were less likely than American children to show more than one type of expression in response to failure. In response to success, Japanese children expressed less pride and more embarrassment. In general, Japanese children appeared to show little shame or pride compared to American children (Lewis et al. 2009, p. 10).

While there were differences between American and Japanese children, no differences were found between White and African American children. There are few studies that show emotional differences between African Americans and White Americans of European descent. The difference between embarrassment after failure and embarrassment after success was much greater for American children than for Japanese children. American children, whether of White or African American descent, showed less embarrassment after success compared to embarrassment after failure, while Japanese children showed the same values under both conditions. The authors attribute the much greater embarrassment shown by Japanese children to the cultural differences associated with the fact that they are the subject of someone else’s attention. Miyake and Kosuke (1995) have argued that it is probably frightening and embarrassing for Japanese children to be in the centre of attention and not be part of the group, whereas in American culture, it is much more frequent and socially desirable to be praised.

Lewis and his colleagues (2009) see here a connection between the Japanese culture of the “we-self” and the “I-self” of American culture (based on Kitayama and Markus 1999; Markus and Kitayama 1994, as cited in Lewis et al. 2009, p. 10). Here the authors see a clear contrast to the perspective on Japanese culture suggested by early anthropological literature. Instead of being a culture that socialises solely out of shame, the cultural goals of promoting a “we-self” orientation can lead to more differentiated, self-evaluative emotional responses that depend on the demands of the situation, age and goals of the child.

Kitayama and Markus (1999) observed self-confident, self-evaluating emotions in response to performance tasks and found differences in the cultural view of "we ourselves", "I myself" (Kitayama and Markus 1999; Kitayama et al. 1997). They describe how American children tend to orientate themselves towards an "I-self" view and feel more pride or shame when they are successful or fail. Japanese children who orientate themselves towards a "we-self" view are less likely to react to personal success or failure in an environment that reliably evokes this expression in American children. American children who are socialised in an "I-culture" respond to successes and failures in a way that is consistent with the perceived performance of the self. Japanese children, on the other hand, who are socialised in a "we culture" show patterns of expression that reflect their fearful ambivalence about being in a context in which their performance is shown to another.

In addition to cultural practices that can explain the differences in the self-confident emotional responses of American and Japanese children, there are also some indications that temperament may continue to play a role. Several studies have found early differences between East Asian and West European groups in the first 6–12 months of life that may be related to temperament. East Asian and European American infants differ in negative facial expressions (Camras et al. 1997, 1998, 2002). Japanese infants displayed less screaming and decreased eyebrow expressions, both of which are characteristic of negative emotions (Camras et al. 1998). In contrast, few differences in smiling behaviour between Japanese and American infants were found (Camras et al. 1998; Fogel et al. 1988). In summary, these studies suggest that Japanese children have fewer vocal and negative facial expressions than Americans of white European descent. Less expression of shame and sadness in the present study supports this general finding of less expression of negative emotions, although the results of less pride and more embarrassment do not.

Even these early differences in negative expression, often due to temperament, can be cultural. For example, Japanese care practices may increase children's tendency to be less expressive. Japanese mothers touch their infants more than American mothers and tend to react more selectively to infant voices, actions that could serve to inhibit or minimise infant expression (Fogel et al. 1988). In contrast to Japanese and South American emigrant mothers, Japanese–American mothers showed behavioural patterns consistent with Japanese cultural values of privacy, tranquillity and weakened verbal communication (Bornstein and Cote 2001). Such socialisation practices seem likely to reinforce less intense emotional expressions, especially negative emotions, in Japanese children. Thus, the tendency of Japanese children to express less sadness, shame and pride and a narrower range of expressions in response to failure in this study (Camras et al. 2002) is likely to reflect an interplay of early temperamental differences and socialisation practices. The study of the interplay between early individual differences in expression and cultural differences is a complex enterprise that probably requires a longitudinal study. The study shows that cultural differences in the self-evaluation of emotions are observable at least from the age of 4 years.

1.5.2 Cultural Context and Differences in the Understanding of Failure Using the Example of Chinese and Western Cultures

Pitta et al. (1999) have established in their research that cultural context plays a decisive role in the question of what is understood as failure, because culture is a relevant basis for ethical behaviour and determines what is ethical and what is unethical in the respective context. In China, *guanxi* (a set of connections or relationships) determines the context of the business in which a set of expectations and a certain degree of trust can be expected. Thus, when Chinese managers negotiate a contract, they rely less on the content of the contract than on the context in which it was negotiated. The relationship between the individuals is particularly important. When a conflict arises, Chinese managers believe that communication and relationships will solve it. There is less concern about compliance with the terms of the contract, as the contract is seen as a symbol of the relationship between the partners.

By contrast, Western managers consider the content of a contract to be very important. The concrete wording, the dates, the amounts and the responsibilities are clearly defined. For an American manager, negotiating the details implicitly means striving to meet the requirements of the contract. Failure to meet the terms of the contract will mean embarrassment in the American context, or in the worst case, a loss of face. The situation is even more pronounced for German managers. According to Pitta et al. (1999), German culture can be regarded as even more contract-orientated than American culture: Every single aspect of the contract is regarded as binding.

In the German, American and Chinese cases, different evaluations and assessments regarding errors and failures and the associated potential ethical conflicts can be derived solely from the different value systems of the cultures.

Differences between the American and Chinese contexts were also the focus of the psychological and neurobiological research of Mu et al. (2015). Starting from the fact that humankind is unique among all living beings in the ability to develop and enforce social norms, but noting that there are great differences in the strength of social norms between human societies, Mu et al. (2015) examine how violations of social norms are recognised at the neurobiological level. In the context of cultural neuroscience, they use non-invasive electroencephalography (EEG) to investigate the violation of social norms in order to investigate the neuronal mechanisms underlying the recognition of norm violations and how they differ between cultures. With the help of EEG recordings of Chinese and American participants (n = 50), Mu et al. (2015) were able to demonstrate a consistent negative deflection of the event-related potential by 400 ms (N400) across the central and parietal regions, which serve as cross-cultural neural markers for the recognition of norm violations. However, the N400 in the frontal and temporal range was observed only among Chinese, not among American participants, illustrating culture-specific neural substrates for the detection of norm violations. In addition, the frontal N400 predicted a variety of behavioural and attitudinal measurements related to the strength of social norms found including higher cultural superiority and self-control but lower creativity

(Mu et al. 2015, p. 15348). The authors began from the following contention: Although the existence of social norms is universal in all human cultures, there are great differences worldwide in the observance of social norms and the punishment of violators of norms. The question arose whether the neuronal basis of the recognition of violations of the social norm reacts to cultural differences. Mu et al. (2015) started from the premiss that human groups in countries such as China with a high level of territorial threats, national defence, low natural resources (e.g. food supply) and many natural disasters (e.g. floods, hurricanes and droughts) were confronted with societies that were more likely to develop into close relationships, in terms of having strong norms and less tolerance for deviant behaviour to coordinate their social action. Human groups in countries such as the USA that generally have lower levels of threat develop into loose groups with weaker norms and greater tolerance for deviant behaviour. Thus, individuals in close relationships tend to adhere to social norms and are more sensitive to injuries from others, compared to those living in loose cultures. Mu et al. (2015) also assumed that the N400 is a neuronal marker for the recognition of norm violations and that its amplitude will be greater in response to social norm violations in narrow (e.g. Chinese) cultures than in loose (e.g. American) cultures. The investigations of Mu et al. (2015) examined cultural differences and questioned whether such neurobiological differences are related to cultural differences in a variety of attitudes and behaviours. In comparison to loose cultures, the authors assumed that individuals in narrow cultures have more self-control, prefer standard to creative solutions for tasks, attach more importance to territorial defence (i.e. maintaining order in their own country) and are more ethnocentric (i.e. believe that their own culture is superior to others and reject deviations that threaten social order). These are human adaptations that always support and reinforce the strength of social norms (Mu et al. 2015). Such correlations of tightness and loosening have been found at the national and state levels of analysis, suggesting a compromise of more order, stability and cohesion in tight groups, but more creativity and openness in loose groups (Mu et al. 2015, p. 15349).

1.5.3 Cultural Dimensions as Relevant Factors for Error Understanding and Management

Helmreich and his colleagues (Helmreich and Davies 2004; Helmreich 2000; Helmreich et al. 2000) have been intensively researching errors and cultural differences in the context of aviation since the 1990s. In various large international studies, flight teams from 22 nations were examined, and the influences of three culture dimensions were identified as relevant for the cockpit regarding risk minimisation and error culture, namely, the professional cultures of pilots, the cultures of organisations and the national cultures surrounding individuals and their organisations (Helmreich 2000; Helmreich et al. 2000). This book presents in Part VIII several chapters that deal with aviation and cultural issues in more detail than is possible at this point, so only the research findings relevant to the cultural aspect are listed here.

Helmreich et al. (2000) found in their studies that there are significant differences in the way pilots carry out their work depending on national culture and that these differences affect safety. Their research design was based on Geert Hofstede's (1980, 1991) four-dimensional cultural model, in particular his survey on work attitudes (Chaps. 10, 13, 24, 29, 31, 32), which they then supplemented with a series of new questions relevant to the aviation environment. Their studies showed that three of the four dimensions of Hofstede proved to be conceptually relevant for team interaction in the cockpit: power distance, individualism collectivism and uncertainty avoidance

The first of these, power distance, reflects the acceptance of unequal power relations by subordinates and is defined by statements that younger people should not question the decisions or actions of their superiors and the nature of leadership (i.e. consultative versus autocratic). Crew members from 22 nations were examined. A high power distance score indicated the acceptance of a more autocratic type of leadership. Helmreich et al. (2000) found that cultures with a high power distance can suffer the certainty that people are not willing to contribute to the actions or decisions of executives. Countries such as Morocco, the Philippines, Taiwan and Brazil had the highest values, indicating the highest acceptance of unequally distributed power. At the other end of the power continuum were countries such as Ireland, Denmark and Norway, with the USA also positioned at the lower end of the distribution.

The second dimension, individualism collectivism, describes differences between individualistic cultures, where people define situations in terms of costs and benefits to themselves, and more collectivist cultures, where the focus is on harmony within their own primary work or family group. The concept of teamwork and communication can be achieved more easily by collectivists than by people with a more individualistic orientation. The USA and Australia performed best in individualism, while many Latin American and Asian cultures were considered highly collectivistic.

The third dimension, termed "uncertainty avoidance" by Hofstede (1980, 1991), was redefined by the researchers in that it was interpreted as requiring written procedures for all situations and that the rules of a company should never be broken, even if they might be in the best interest of the company. This dimension was described by Helmreich et al. (2000, Helmreich and Davis 2004) as "rules and order" and could have both positive and negative effects according to their understanding. Those who deal with it are perhaps the least inclined to deviate from procedures and rules, but they are less creative in dealing with new situations. These low levels may be more vulnerable to procedural breaches but may be better equipped to deal with conditions that are not covered by the procedures. On the newly defined scale, Taiwan, Korea and the Philippines performed best, while Anglo-Saxon cultures such as Great Britain, Ireland and the USA performed very poorly.

In view of the advance of automation and the 4th Industrial Revolution, the results of the research by Helmreich et al. (2000), Helmreich and Davis (2004) are particularly relevant in terms of the error aspect: They were able to demonstrate

that there are significant cultural differences in attitudes towards automation—both preference for automation and opinions about its application (Helmreich et al. 2000, p. 7). In particular, pilots from high-performance groups proved to be particularly successful in terms of both automation and the likelihood that it would be used under all circumstances. The authors conclude that there are no "good" and "bad" national cultures in terms of the prevalence of human error and the goal of safety and error culture, because each specific culture includes elements with positive and negative effects on the effective group function, as it influences these universal goals. Helmreich et al. (2000) therefore attach particular importance to specific organisational cultures in actively promoting a safety culture and maximising the positive and minimising the negative aspects of professional and national cultures. Helmreich and Davis consider it crucial to develop culturally congruent organisational initiatives and at the same time increase safety, suggesting that this could be achieved, for example, by declaring error management a universally valued goal that can be accepted by individuals from all cultures. Under the two objectives of threat and error management, training programmes can be conducted that do not violate cultural values, but nevertheless lead to desired behaviours.

1.5.4 Cultural and Organisational Factors as Relevant Factors Influencing Each Other in Dealing with Errors

As described earlier in this chapter, from the point of view of error management, Frese and Keith (2015, p. 665) assume, on one hand, that it is pointless to try to prevent the occurrence of all errors and, on the other hand, that errors are omnipresent. Errors cannot be completely prevented because human cognitive equipment is designed for error-prone heuristic processing and not for potentially error-free algorithmic processing (Reason 1990). Frese and Keith assume a certain general validity here, even if they notice differences between sexes and cultures (Li et al. 2012; Roese and Vohs 2012). The boundaries between organisational and national factors are certainly fluid. Thus Frese and Keith (2015, p. 668) refer to the increased number of air accidents in South Korea in the 1970s, with a military background that was associated with an extraordinarily strong hierarchical orientation. They emphasise that for an appropriate perception and articulation of errors, a great difference is beneficial, because too great a similarity of participants reduces errors to detect and report. But even if diversity and multi-perspectivity are ensured, the interfaces must be optimally communicated. As an example, the authors refer to a NASA mission that ultimately failed because it was too late to notice that one partner used metric units and the other English units (Bell and Kozlowski 2002 as cited in Frese and Keith 2015, 669).

van Dyck et al. (2005) have conducted studies on the culture of organisational error management in two different European countries. They examined 65 Dutch

companies and 47 German companies. This is interesting because Germany and the Netherlands belong to different clusters of leadership culture (Brodbeck et al. 2010, as cited in van Dyck et al. 2005, p. 8). The Netherlands is rated lower than Germany in terms of error intolerance (among 62 countries, the Netherlands ranks 12th in terms of error intolerance, while Western Germany ranks 2nd) and in terms of uncertainty avoidance (suggesting that the uncertainties caused by errors are less likely to have negative consequences). Van Dyck and her colleagues found that error management contributes positively to the performance and survivability of companies. Important factors include communication about errors, exchange of error knowledge, help in error situations and rapid error detection and analysis, effective troubleshooting and coordinated error handling. These elements of the error management culture can help avoid and reduce negative error consequences and develop better strategies for dealing with errors in the future (van Dyck et al. 2005). These results agree with those of Edmondson (1996) and Helmreich and Merritt (1998), who also emphasise the importance of free-flowing communication, the rewarding of error reporting (or at least its non-punishment) and a continuous reflexive and interactive learning approach to increase success and security in high-security organisations. No notable differences that could be attributed to cultural factors are mentioned by the authors; it is merely pointed out that:

> Despite this diversity in positions and departmental affiliations, managers tended to agree in their assessment of their company's error culture, indicating that error culture may indeed be a pervasive organizational characteristic. Nevertheless, it is still possible that managers and rank-and-file workers differ in their assessment of their company's culture. Future research should address this concern by collecting information from both managers and workers. (van Dyck et al. 2005, p. 1237)

New studies from the USA have added completely different findings regarding cultural implications in the perception of mistakes and how to deal with them.

1.5.5 Differences in Safety Culture and Risk Perception and Their Effects Using the Example of Latin American and Non-Latin Construction Workers in the USA

As Kane Bormann and colleagues (Bormann 2012; Bormann et al. 2013) have found in a large cross-sectional study conducted in the Denver Metro and Northern Colorado areas, there are major differences in safety culture and risk perception between Latin American and non-Latin construction workers. A number of factors have been shown to play a significant role in the errors and failures in these technically very complex contexts. The reason for the study was that in the USA construction industry, Latino workers currently suffer a disproportionately high number of injuries and deaths compared to non-Latino workers. Studies showed that potential Latin American construction workers with very little knowledge of health and

safety, the ability to enforce safety regulations and little or no prior knowledge of the construction industry are entering the USA (Brunette 2004 as cited in Bormann 2012, p. 19).

Available educational resources seem to be of particular importance here. On one hand, there is a language barrier between Latin American and non-Latin construction workers. In order to avoid mistakes or to be able to communicate, linguistic communication must be possible, especially in complex contexts such as construction. However, according to a 2003 National Safety Council content survey (Vazquez and Stalnaker 2004), few Latinos speak English when entering the USA, and more than 71% of companies employ non-English-speaking workers or non-English-speaking workers. This is also the reason given to explain why Latino immigrants and Spanish-speaking workers often receive less training in occupational safety and health (Ruttenberg 2004). Also, it seems that native speakers are less willing to explain things to people with limited English, and foremen get frustrated when they try to explain to employees how to do a job safely and properly (Ruttenberg 2004).

Another educational resource proved to be relevant in this context: In 2010, the Morrison Institute (Vazquez and Stalnaker 2004) reported that Mexican immigrants had an average of less than 9 years of schooling and only about half of Latinos in the Western USA had high school education. The US Census Bureau (Vazquez and Stalnaker 2004) conducted a similar study and found that 27.3% of adult Latinos had less than a ninth grade education. As a result, many of these people are incompletely alphabetised in English. Bormann (2012) points out that for Latinos, learning opportunities such as written work instructions, safety briefings, observations and discussions between workers that could help supplement formal classroom training are not as useful or effective if the knowledgeable and experienced construction workers and managers speak only English (Vazquez and Stalnaker 2004).

In addition, there are other relevant factors, namely, that young workers are preferred for physically heavy work in the construction industry. They are particularly vulnerable to errors and hazards at these workplaces because they lack experience and training and are therefore less likely to be able to identify hazards (Williams Jr et al. 2010), lack educational resources and often have an unexplained legal status. Some authors also come to the conclusion that young workers in particular lack the physical strength to cope with some work tasks and lack the individual maturity to make correct judgements and the confidence to talk to their superiors about dangers (O'Connor et al. 2005).

Various authors refer in particular to socio-political factors influencing errors and failures, namely, the fear of immigration status and the strong economic pressure to remain employed (Brunette 2004). Criticism of grievances and the reporting of mistakes could lead to job loss or deportation, while the rejection of dangerous work conditions could mean that the money for the workers and their families can no longer be raised (Williams Jr et al. 2010). These barriers can all lead to unsafe working environments and the problem that Latinos do not fully report the number of nonfatal injuries in order to maintain positive relationships with employers (Brunette 2004).

Other studies focus more on the cultural differences between Latinos and non-Latinos to explain the significantly higher accident and death rates among Latinos.

Both Brunette (2004) and Vazquez and Stalnaker (2004) point out that at the beginning of the century, Latinos immigrating to the USA, as well as workers, have different histories, cultural sensitivities, strong health beliefs and cultural backgrounds to non-Latin American workers. Brunette (2004) and Vazquez and Stalnaker (2004) conclude that some Latin American cultures and values could pose challenges and lead to safety problems on the construction site. For example, Vazquez and Stalnaker (2004) observes that Latin American culture teaches that authoritative personalities must be accorded the highest respect, which means that Latinos rarely disagree with superiors, even if they are wrong as superiors. This cultural value of respect would also prevent Latinos from asking questions or challenging instructions from superiors. Canales et al. (2009) confirm this by referring to the weak UA in Latin American culture that leads to excessive zeal being considered inappropriate (Canales et al. 2009). Canales et al. (2009) comment that this is shown by the phenomenon that people often prefer to remain silent rather than to tackle problems offensively. According to Canales et al. (2009), the Latinos attach great importance to the family, which often goes beyond the primary family members. In the workplace, Latinos often talk to each other and create close relationships but hesitate to discuss issues with non-Latinos or regulators. The development of trust in Latino culture therefore requires time to build personal relationships. Given the nature of construction and the constant movement around construction sites and relocations, it is unlikely that Latinos will develop these relationships with superiors, which is why they never really build trust with each other (Vazquez and Stalnaker 2004).

Bormann (2012), Arciniega et al. (2008) and Menzel and Gutierrez (2010) also refer to the concept of "machismo" as relevant in this context. Machismo refers to a standard of behaviour shown by men and understood as the male force that in one way or another influences all male behaviour both positively and negatively (Arciniega et al. 2008). In a study by Menzel and Gutierrez (2010), respondents stated that machismo plays a role in the higher injury rates of Latinos when it prevents Latino workers from wearing safety equipment (Menzel and Gutierrez 2010).

Differences in risk perception between Latinos and non-Latinos could also be observed in the studies mentioned above. Already in the late 1980s, sociological and anthropological studies were able to show that the social and cultural environment had a formative effect on risk perception and the acceptance of forms of risk (Slovic 1987), as well as on the way in which employees perceive these safety regulations and procedures and, in the process, also on the level of safety and the handling of errors at the workplace (Mohamed 2002). Menzel and Gutierrez (2010) investigated this in a qualitative study with Latino trade union workers in the south of Nevada, in which differences were determined, especially with regard to the perception of injury risks. Menzel and Gutierrez (2010) found that the level of professional qualification influenced the perception of responsibility for safety and accident prevention. Low-skilled workers saw responsibility primarily in the hands of the employer, while highly qualified workers preferred to place responsibility with themselves and their employees. Another identified factor affecting perceived risk was immigration

status, where illegal immigrants seemed more prepared to take more risks at work (Menzel and Gutierrez 2010). English literacy has proven to be particularly significant, affecting the ability of Latino staff to read and understand security training and signs. The fourth decisive factor here was also the traditional Latin American culture.

1.6 The Contribution of This Book: Introducing the Content

This book adds to the literature on mistakes, errors and failures and takes various theoretical and methodological perspectives into account while drawing from a variety of focus points.

In the following section, we briefly introduce the content of the chapters to provide an overview of the varied subjects covered in this book. The book is divided into 8 parts, containing 32 chapters.

Part I focuses on mistakes, errors and failure on cultural and individual levels.

Elisabeth Vanderheiden begins the book by focusing on the topic of life crisis—which may be caused by the death of a loved one, serious illness or disability, the breakup of a relationship, a divorce, the loss of workplace, unemployment or even the impact of natural or technical disasters or political disasters like war, genocide, flight or structural suppression. Such life crises are often experienced by the person affected as an expression of failure, the result of individual wrong decision-making or as the consequences of personal misconduct, which can also lead to ill health. The chapter focuses on how to deal with these issues on an individual basis from a resource-orientated perspective.

This chapter is followed by **Paul C. Rosenblatt's** chapter on errors, mistakes and failures in love letters and written communication. The author analyses ten sets of published love letters from the 1820s to the 1940s, in which he discovers that most love-letter writers raise concerns about the meaning of gaps in communication and the brevity of explanations. The author points out strategies for addressing and avoiding failures, mistakes and errors in exchanging love letters and communication during the described contexts and times.

Further on, **James L. Kelley** investigates the life of Donald Fagen from a psychobiographical perspective. His psychobiographical examination of the subject with an object relations emphasis highlights that Fagen used his role as a successful musician to confer on himself a sense of legitimacy and to distance himself from the structures of conventional "bourgeois" existence. The chapter focuses on mistakes, errors and failures of the musician.

Part II refers to mistakes, errors and failure in society.

The author **Sofia von Humboldt** points out new and highly relevant aspects of age and longevity from global and cultural perspectives. Her chapter discusses mistakes, errors and failures in the cultural context of research, policy and interventions

in old age. The chapter concludes with a discussion of future suggestions for research and policy interventions for dealing with longevity from cultural and cross-cultural perspectives.

From a sexuality research perspective, **Aliraza Javaid** explores possibilities for mistakes, errors and failures. Drawing upon his personal experiences of conducting what Janie M. Irvine aptly calls "dirty work", he sheds light on his different (sometimes presumed) mistakes, errors and failures when doing sexuality work. He locates these in their cultural and social contexts, delving into hindsight to resurrect memories of pain and loneliness when doing such work, with the assistance of research diary extracts. In his chapter, Javaid exposes his vulnerability as a researcher with regard to doing sexuality work and what this could mean for other and potential sexuality writers. He provides examples of his work and opens it up for further discussion on how to deal with "risky" research constructively.

Maike Baumann explores research on hierarchies across cultures and reasons to assign a leading role to one party in an interpersonal relationship which can include advanced knowledge or expertise, seniority, agreement and ownership or control of resources. The author reflects on expectations, including qualities of interaction, responsibilities, the other's value system and, consequently, the other's behaviour as well as assumptions concerning the other's expectations. She provides a new and original model for dealing with hierarchical relationships positively and resource-orientated. The proposed model helps analysing existing conflict dynamics and repeatedly occurring conflicts with the goal of enabling the development of understanding and a change of behaviour, by using insights from systemic theory, research on cognitive biases, sociolinguistics as well as motivational theory.

Claude-Hélène Mayer and **Lolo Jacques Mayer** present an ethnographic case study which refers to the experience of failure in intercultural communication and relationship-building for members of different cultural and racial groups within a specifically selected public space in South Africa. The authors focus on concepts of erroneous identity ascriptions, intersectionalities and power which respond to the question "Who am I?" in a specific sociocultural context. Findings show that failed intercultural communication and ascribing identities in intercultural contexts can lead to erroneous assumptions about "the other", interwoven in conscious and unconscious discourses of race, power and accessibility to resources—which contribute to the failure of employee–client relationship-building in intercultural public spaces.

Klas-Göran Karlsson and **Bo Petersson** provide outstanding new insights into the final stage of the history of the Soviet Union, from 1985 to 1991, when the last Communist Party and Soviet state leader Mikhail Gorbachev tried to reform his country by making economic life more effective, widening the scope of political participation, opening up history and culture for debate and introducing a new, peaceful thinking in international affairs. Gorbachev wanted to save the Soviet system but ended up destroying it. The chapter focuses on political mistakes which are often difficult to distinguish from failures caused by structural problems. The chapter deals with these difficulties and provides new insights into political decision-making.

In Part III, the authors focus on mistakes, errors and failure in organisations.

Alessandro Carretta, **Paola Schwizer** and **Lucrezia Fattobene** write about errors and failures in European banking from cultural perspectives, seeing misconduct as a result of errors in policies and procedures, of mistakes in individual behaviours, of failure in management and control systems. The researchers elaborate on a new theory of risk culture in banking and develop a general framework of errors and failures in banking while taking the existing literature and empirical evidence that is currently available into account. They further focus on the influence of national (banking) culture on risk and perception of errors and mistakes; the trade-off between risk appetite and control culture in decision-making; the impact on reputational risk of misconduct driven by errors in management practices; the role of media (traditional and social) in influencing public opinion about banks and enhancing the effects of errors on capital markets, risk management practices, compliance with law and regulation, individual behaviours and organisational structures; and the role of banking regulators and supervisors in the handling of errors and mistakes. Finally, the authors demonstrate that culture is one main driver of organisational and individual behaviours and consequently of errors, mistakes and failures in bank management.

Fernando Lanzer Pereira de Souza analyses how mistakes are handled in organisations across different cultures by looking at them through the prism of Huib Wursten's (Wursten and Lanzer 2013) mental images, a framework that takes Hofstede's four classic dimensions of value, reshaping them into six different styles of organisational culture. In addition, Japanese organisations provide a seventh and different style which is taken into account. The resultant seven business culture styles (contest, well-oiled machine, network, social pyramid, traditional family, solar system and Japanese) are described in terms of how they differ in the way that they identify and deal with mistakes. Several practical examples taken from real-life situations are provided and reflected on in this chapter.

Claude-Hélène Mayer provides an in-depth insight into ethnographic experiences of conflict and failure in a South African work context, perceived from the perspective of an individual with a European cultural origin. The author analyses and interprets conflict in work experiences and a specific work relationship from systems psychodynamic theory perspectives, to provide new and differentiated ideas on the in-depth complexity of conflict experiences in a specific cultural context. The purpose of this chapter is to offer insight into an intra- and interpsychological conflict experience from an ethnographic perspective. A single individual's case is presented through interviews, field notes, contextual descriptions and interpretations. Recommendations for future theory and practice are offered.

Rudolf M. Oosthuizen writes in his chapter about perceptions of failure synthesised in studies investigating resilience factors to emotional distress resulting from the experience of failure in organisational settings. The author introduces the impact of failure experiences and conceptualises resilience-based approaches and concludes by discussing the implications for psychological resilience-building inter-

ventions in response to failure, error or mistakes for individuals and teams in organisations.

Elmar Nass reflects on credible corporate culture in value-based organisations with special regard to Christian companies. The author refers to Christian business ethics and provides a Christian image of humans which presupposes the defectiveness of mankind. He further hypotheses that lived error culture has yet to be researched and practised. A systematic approach to how the Christian image of humans is a basis of values, which should determine the error culture, is presented. The author proposes selected principles of Christian error culture as a normative compass for organisations.

Thomas Ryan also focuses on a Christian context and writes about the Catholic Church in Australia and its instance of gross moral failure in the final findings of the Royal Commission into Institutional Responses to Child Sexual Abuse of December 2017. This specific case study in moral failure is approached through the interplay of psychology and moral science. The author suggests a new approach on how to deal with the mistakes, errors and failure and offers grounds for hope in the task of cultural change.

Mary Hallay-Witte and Bettina Janssen write about sexual abuse in the Catholic Church in Germany and how this was being concealed and information withheld over years by church representatives. The authors emphasise in this chapter that up to the present day, victims testify scandalous mishandling of their cases. Mistakes and omissions made in the past continue to be repeated in the present. This chapter presents findings of the research project titled “Sexual abuse of minors by Catholic priests, deacons and male members of orders in the domain of the German Bishops Conference” and highlight relevant touchstones for future reappraisal and for future intervention into and protection from the sexual abuse of minors.

Part IV takes an educational perspective into account.

Amber Simpson, **Euisuk Sung**, **Alice Anderson and Adam V. Maltese** explore the terms “failure”, “mistakes”, “errors”, “obstacles” and “struggle” which are often used interchangeably across disciplines and cultures. The purpose of this chapter is to synthesise and clarify how these terms are articulated and utilised in research studies and commentaries published between 1970 and 2017. Through a systematic literature review, the authors discuss similarities and differences in how researchers have defined these terms, as well as how these definitions differ by cultural context, discipline and age of participants. The authors also provide insight into their own research study including 500 youths and 150 educators situated in a variety of educational settings. The authors conclude with open questions and recommendations for the field to consider when conducting research around failures, errors and mistakes in educational contexts.

The authors **Naomi Takashiro** and **Clifford Clarke** include different ethnicities in their study of students with low socio-economic status and identify what factors contribute to their academic success following failure, in a systematic review of 19 qualitative studies, which were published between 2000 and 2018. Their findings are grouped under three themes: (a) family and others’ support and influence, (b)

motivation and (c) learning strategies. The authors also refer to the topic of culture shock and cultural adaptation to new cultures as motivation. The findings are of value to researchers, educators and school officials who are interested in educating disadvantaged students who manage to achieve academic success despite adversity, mistakes, errors and failure.

Thalita Camargo Angelucci and **María Isabel Pozzo** use a psychoanalytical perspective, associating the subjective development of human beings with their appropriation of the language of their environment. The authors affirm that the subject is structured in and on language while taking migration issues into account. With this focus, they highlight significant errors in processing teaching and learning languages by presenting theoretical reviews on polysemy and the plurality of meanings, within the concept of error in the field of foreign language teaching. Thereby, the sociolinguistic perspective of Marcos Bagno and the methodological approach of discourse analysis are adapted with regard to applying a positive and resource-orientated view of learners' mistakes and errors.

Part V focuses on mistakes, errors and failure in psychology, therapy and counselling.

Kathryn Nel and **Saraswathie Govender** investigate deficiencies in the use of therapeutic and theoretical models in psychology on the African continent, which stem from individualistic theories with Western philosophical underpinnings. The authors emphasise that the notion of "if the client does not speak, the therapist does not speak", might work for middle-aged to elderly persons from a Western cultural background, but is doomed to failure in an African setting. The chapter explores how the failures and misunderstandings brought about by using psychodynamic therapy cause therapeutic misunderstandings and failure. A brief overview of the key points in the work of Klein, Winnicott and Fairbairn is given, and culture-specific insights regarding African collectivism and caregiving are presented. The chapter provides insights into case-study examples, outlining how psychodynamic therapy failed in these settings.

Researchers **Christine Bales, Josua Leibrich, Katja Brinkmann, Ibrahim Özkan, Umut Altunoz, Janina Wesolowski** and **Maria Belz** demonstrate learning from treatment errors in transcultural psychiatry and psychotherapy and need for transcultural sensitivity in psychotherapeutic and psychiatric treatment of migrants, by both the patient and the therapist, based on mutual misunderstandings due to cultural differences. The chapter describes selected cultural differences, language barriers and different expressions of psychological stress and the experience of "othering". Therapists' insecurities might be anchored in fear of making mistakes, resulting in their avoidance of taking migrants as patients. The chapter takes processes of culturalisation and attribution errors into account which lead to treatment errors. Case descriptions present strategies to approach diversity phenomena successfully by avoiding errors and mistakes in transcultural psychiatry and psychotherapy. A case vignette offers an example of describing transcultural treatment processes.

Jung's archetypes have been subject to numerous research studies, as is the case in this research study by **Claude-Hélène Mayer**. In this chapter, the author reflects on the trickster archetype and its implications in the life of Michael Jackson, an American leader in the music industry, by using a psychobiographical approach. She offers an analysis of the behaviour of Michael Jackson within the context and expression of the trickster archetype, and his appeals to fluidly overcome boundaries of race, gender, generation and culture with ingenuity, creativity and positive leadership. In the end, however, it is assumed that the strength and power of the trickster archetype active in this celebrity's life led to failures, and ultimately to his premature death. It is argued that the trickster archetype needs to be recognised, seen, acknowledged and understood in its depth to maintain the success of the leader or to transform leadership stories from those of failure to stories of success.

Pei-Luen Patrick Rau, Zhi Guo, Qie Nan, Xin Lei and **Andong Zhang** present the theoretical framework and empirical research on cognitive bias in cross-cultural design, together with the integrative framework of training design. The authors discuss information processing and emotional biases as resources which help the human individual to survive and examine the relationships between mental models and user-centred designs. Further, the authors present empirical research in cross-cultural design, bias and the influence of cultural dimensions by providing practical insights into case studies in the design.

Part VI illuminates mistakes, errors and failure in law and justice.

Wayne Petherick describes errors and failures as critical within the forensic disciplines, such as forensic science, forensic psychology/psychiatry and forensic criminology, where they might have a profound negative impact on the life or liberty of the individuals concerned. Errors and failures can occur when experts do not avail themselves of all the evidence available in a given case or when they remain, at best, unaware that more evidence exists, when experts are unaware of their own limitations or where bias or cognitive distortion taints the expert's opinion even when the evidence may be voluminous. This chapter examines error from the perspective of forensic criminology, incorporating the evidentiary considerations of validity, reliability and sufficiency, followed by metacognition and cognitive bias. Case studies are used as examples throughout with some recommendations provided for how current and future generations of forensic psychologists can overcome the obstacles to effective forensic examination.

For those who are combatting failure in crime eradication, this chapter by **Claude-Hélène Mayer** describes the common attempts to combat and eradicate wildlife crime by examining examples of wildlife crime in different national and cultural contexts. The author explores the sociocultural circumstances surrounding international, regional, national and local attempts to address wildlife crime. This chapter aims at contributing complex strategic reflections to transform failures in wildlife crime eradication into mindful strategies which take cultural aspects into consideration to defeat international wildlife crime successfully in the context of green criminology.

Part VII directs attention to mistakes and errors in the medical arena.

Chris P. Subbe and **Paul Barach** reflect on the training of clinicians in both nursing and medicine, to reduce error rates to a negligible level. The authors explain that error rates in many areas of medical treatment have not significantly changed for decades, describing dominant philosophies of error reduction, such as "Safety 1", which focuses on understanding errors, and "Safety 2", which looks for ways to strengthen existing successful methods of working safely. In this chapter, another principle is taken into account, namely, the acceptance of fallibility of individual parts and their application into the medical context. Such acceptance is still rare, but necessary to alter organisational culture and clinical outcomes.

The author **Jan S. Brommundt** also focuses on the error management system in medical contexts, its techniques, its structures and its embeddedness in a broader error management culture. He shows that the system of open error management requires an innovative culture, open hierarchies, multicultural perspectives and the empowerment of personnel traditionally working at the lower levels of hierarchical systems. The author concludes that the views proposed are necessary, efficient and cost-effective and provide a basis for an improved error and failure management within medical systems.

According to **Florian Fischer, Franziska Carow and Hannah Eger**, mistakes, errors and failures often offer opportunities for development when managed openly and constructively. However, the fear of mistakes and failures and the cultural assumptions of defining them as a threat to self-esteem often reduce the ability to manage errors, mistakes and failures optimally. By contrast, an open error culture contributes to safety but also to individual health and well-being. This chapter suggests that a humorous handling of errors, mistakes and failure can contribute to individual health and well-being and can thereby become a health-promoting resource.

Part VIII highlights mistakes, errors in traffic and aviation.

In the aviation industry, the safety system is critically dependent on the reporting of adverse events, and, in the majority of cases, these adverse events emanate from multiple systemic failures of which the final failure is the human operator or the air traffic controller in the case of this chapter written by **Jaco van der Westhuizen, Matita Tshabalala** and **Karel Stanz.** The chapter describes how the aviation industry, through the International Civil Aviation Organisation, subscribes to the notion of a just culture, where staff can report mistakes, errors and failures into a safety management system with the promise of amnesty, provided that gross negligence or sabotage is not present. It further introduces the challenges of dealing with mistakes, errors and failures within the South African context which is multicultural—and, with 11 official languages, is also multilingual. The authors discuss the influence of local cultures and performance-setting criteria on the reporting of errors and on views concerning these errors. The authors reveal the hidden potential of learnings regarding errors, failures and mistakes through a group engagement process to manage errors, failures and mistakes professionally.

The following chapter written by **Jan U. Hagen** also deals with the aviation context, explaining how multiple aircraft accidents result from a lack of error communication. The chapter shows that, even though cultural differences have been cited as contributing factors to aircraft accidents, many accidents happen owing to the different hierarchical status of first and second officers and the reluctance of the latter to speak up during critical situations. This is why, three decades ago, crew resource management was developed in the air industry, to achieve open, factual error communication and thereby ensure the safe operation of flights. Today, crew resource management is a mandatory part of flight crew training in civilian and military flight operation worldwide. Since its introduction, accident rates have greatly diminished, but the human factor still remains the main cause of accidents. The chapter provides insight into fatal errors in aviation and focuses on the leadership behaviour involved to increase aviation safety.

Vaclav Linkov and **Petr Zámečník** present a particularly interesting study regarding the impact of cultural differences on driving behaviours. The authors report on drivers from particular cultural backgrounds driving in foreign environments and making mistakes induced by foreign cultural backgrounds in the current traffic contexts. Since people in a variety of countries are used to driving with varying levels of aggressiveness, are used to seeing traffic signs that are positioned in different ways and have been familiar with other traffic signs specific only to their country, mistakes happen easily. Recommendations are provided on how to use these mistakes to inspire governments to change policies regarding traffic rules and improve infrastructure so that foreign drivers more easily adapt to the new environment.

The parts and chapters of this book aim at providing new perspectives on mistakes, errors and failure from different cultural, professional and disciplinary perspectives and across these contexts. We wish the readers of this book new individual, cultural and positive insights into the topic of mistakes, errors and failures.

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