Chapter 3

The Nature and Varieties of Human Error

Defining and Classifying Error

Although there is no one universally agreed definition of error, most people accept that it involves some kind of deviation. Such deviations could be from the upright (trip or stumble); from the current intention (slip or lapse); from an appropriate route towards some goal (mistake); or, in some circles, it could even involve straying from the path of righteousness (sin).

Just as there are several possible definitions, so there are also many ways in which errors may be classified. Different taxonomies serve different purposes. These depend upon which of the four basic elements of an error – the intention, the action, the outcome and the context – is of greatest interest or has the most practical utility.

A Classification Based on Intention

As a cognitive psychologist studying the mental processes that give rise to error, I initially favoured a classification based upon intention. With an intentional taxonomy, different types of error can be distinguished as follows:

- Was there a prior intention to act? If not, then this was an involuntary action or automatism rather than an error.
- If intended, did the actions go as planned? If not, we are talking about absent-minded slips and lapses – failures in either the execution or the storage stages of an action sequence.
- If the actions were as intended, did they achieve their desired outcome? If not, then this is likely to be a mistake involving some failure in the planning process. The plan of action did not attain the goal because it was inadequate in some respect. This could

A major drawback of such schemes is that they give little or no clue as to the underlying processes. In order to carry out necessary actions at the right time, in the right order and in the right place, some or all of the following cognitive stages need to be completed correctly:

- *Plan formulation*: the intention to carry out an action must be formulated and then scheduled to be carried out at the appropriate place and time. These actions must, of necessity, be seen as contributing to the achievement of a particular goal.
- *Intention storage*: although some actions may be carried out immediately, it is more often the case that intentions to act are stored in prospective memory, and then reactivated at the appropriate time and place.
- *Execution*: the actions must be initiated and performed as planned.
- *Monitoring*: periodic attentional checks should be made to ensure that the action sequence is proceeding as intended.

An omission can have its origins at any one of these stages. The need for the action can be disregarded during plan formulation; the intention to act can be lost from storage – failures of prospective memory are very commonplace; the act can left out of the intended behavioural sequence during its execution; and its absence can escape notice during an attentional check on progress. The multiplicity of these various possible breakdowns provides strong grounds for predicting that omissions are likely to be the single most frequent error type – as indeed is the case.

Error Types Based on Contextual Factors

The situation in which an error occurs is at least as important as its psychological antecedents (if not more so) in triggering its occurrence and shaping its form. We cannot easily change human cognition, but we can create contexts in which errors are less likely and, when they do occur, increase their likelihood of detection and correction. As indicated in the previous chapter,

situations can be more or less error-provoking. Here is a list of some contextual error types:

- *Anticipations and perseverations*: errors can be clearly shaped by what is coming up and what occurred previously in an action sequence. Actors and newsreaders are especially prone to these kinds of errors. Actors, for example, can be triggered into uttering lines belonging to a later act. This is an anticipation error due to similarities in content, sound or circumstances between the later speech and the current one. Perseverations involve echoing inappropriately something that has gone before.
- *Priming*: these errors are similar to perseverations, although they usually involve the repetition of prior sounds or actions. Many children's games are based on leading people into error through recurrent sound primes. Here is an example: From what tree does an acorn come? *(Oak.)* What noise does a frog make? *(Croak.)* What do you call a funny story? *(Joke.)* What is another name for a cape? *(Cloak.)* What rises up from a bonfire? *(Smoke.)* What do you call the white of an egg? Here, the vast majority of people will respond with *'yolk'* – it is almost irresistible. Three contextual factors combine to make the error highly likely: the prior phonological priming; the fact that a correct answer to the question (the white) was in the question itself – and that is most unusual; lastly, another correct answer (albumin) is a seldom used word in our vocabulary – 'yolk', on the other hand, is very strongly associated with 'egg'. (This example is repeated in Chapter 5, but in another context.)
- *Interruptions and distractions*: these can result in place-losing errors. When we return to the task after an unscheduled interruption, we may believe that we were further along than we actually were, and thus omit a step; or we can judge ourselves to be not as far along as we actually were, and perform an unnecessary repetition. They also cause errors by 'capturing' the limited attentional resource at some critical point in an action sequence. We shall discuss this at a later point.
- *Stress*: local stressors such as fatigue, fear, heat and noise are neither necessary nor sufficient to cause an error, but there is no question that their presence increases the likelihood of going wrong – more about this later.

Outcome Categories

The vast majority of errors are inconsequential; indeed many pass unnoticed both by the perpetrator and by his or her companions. But in dangerous environments, such as those encountered in high-risk sports and hazardous industries, errors can and do have bad outcomes. In these circumstances, it is usually essential to categorise errors according to the severity of their consequences.

It should be stressed, however, that the upshot of a human error is largely determined by the circumstances rather than by the psychological antecedents. Switching on the kettle rather than the toaster causes amusement and mild embarrassment; manipulating a control wrongly in a nuclear power plant, as at Chernobyl in 1986, can be – and was – catastrophic. By itself this action slip by an operator was not sufficient to cause the reactor explosion, but it formed a necessary part of the concatenation of events that led to the disaster.

There is a strong tendency among managers, journalists and lawyers to see a false symmetry between the causes of an error and its effects. An unintended action that results in one or more fatalities is often presumed to be the product of a monumental blunder when, in reality, it was a commonplace absent-minded slip. It is true, of course, that those professionals who work in potentially risky domains have a 'duty of care' towards their fellow workers and clients. This requires them to be aware of the hazards and to be especially vigilant in circumstances known to provoke error. In short, the greater the danger, the greater is the need for 'error wisdom'.

In general, though, it is a bad mistake to treat errors as a moral issue, even though on some occasions they can be egregious and negligent. Error does not necessarily equate to incompetence – though that has been a strongly held view among health-care professionals, for example.

Fallibility is a part of the human condition. Errors cannot be eradicated, but they can be anticipated and managed accordingly. We can't fundamentally change the human condition, but we can change the conditions under which people work in order to make errors less likely and more easily recoverable.

Error outcomes tend to be graded according to their severity, as shown in the list below:

- *Free lessons*: these are inconsequential unsafe acts that could have had a bad outcome in other circumstances. All such near misses provide an opportunity for learning, either at the individual or the organisational levels.
- *Exceedances*: these are not necessarily errors, although they can be. They are situations in which human performance strays toward the edge of safe limits. Such deviations are the stuff of which bad accidents are made. In commercial aviation, for example, flight data recordings are scanned by computers to identify such things as level busts, excessively fast (or slow) approaches, heavy landings and the like. Similarly, railway systems have long collected and analysed information relating to signals passed at danger (SPADs). British studies showed that a very large proportion of the SPADs collected over a given period were associated with a relatively small number of signals. This suggests that the problem arises less of from SPAD-prone drivers as from the poor conspicuity and siting of certain signals.
- *Incidents*: although the term is widely used, there is no close agreement as to what it entails. In general, incidents are 'close call' events of sufficient severity to warrant reporting and/or internal investigation. They may involve temporary damage or relatively minor financial loss. In health care, for example, they can include events in which minor harm is done to a patient, or where serious harm is only avoided providentially. It is often the case that a serious accident is thwarted by the effective operation of some of the barriers and safeguards, even though some defences may have been bypassed or breached. Analysis of several of these events provides important information as to weak defensive elements. These analyses can also give us an idea of where the 'edge' is between relative safety and disaster. It could be said that incidents act towards accident prevention as inoculation works in preventing illness: a little bit of what could do you harm acts to strengthen the systems defences.
- *Accidents*: these are events with significant adverse consequences: injury, loss of assets, environmental damage and/or fatalities.

They fall into two quite distinct groups: individual and organisational accidents. The former are high-frequency/low-severity events – slips, trips, falls, bangs and knocks requiring a few days absence from work. These lost-time injuries (or, more exactly, their normalised frequency per N workers over a given period) are often used as an index of an organisation's relative safety and as a means of comparison with other organisations or industries. Organisational accidents, on the other hand, are low-frequency/high-severity events involving explosions, crashes, collapses, releases of toxic material and the like.

Table 3.1 compares the properties of three kinds of event with regard to their volume (frequency), costs (in terms of human, asset and environmental losses), and the amount of contextual information that can be used for identifying 'upstream' contributing factors. It is generally the case that the available contextual information is inversely related to the frequency of the adverse event. Organisational accidents are extensively reported and investigated in contrast to exceedances that are plentiful but very low on explanatory information. Collectively, these events can reveal where the recurrent problems are in relation to location, activity, task and the people involved.

Error Myths

The topic of human error is rich in myths, but here we will focus on just three of them: errors are intrinsically bad; bad people make bad errors; and errors are random and highly variable.

Errors are not intrinsically bad. They are essential for coping with trial-and-error learning in novel situations. They are the debit side of a mental balance sheet that stands very much in

Table 3.1 Comparing the properties of exceedances, incidents and accidents

Types	*Volume*	*Costs*	*Contextual data*
Exceedances	Very high	Very low	Low
Incidents	Moderate to high	Low to moderate	Moderate to high
Accidents	Low to very low	Unacceptably high	Often very high

credit, but each 'asset' carries a penalty. Automaticity, necessary for skills and habitual action sequences, make us prone to actions-not-as-planned (slips). Limited attentional resources, necessary for coherent planned action, leave us prey to inattention and information overload. A long-term memory containing 'mini-theories' rather than bald facts, leaves us liable to tunnel vision and confirmation bias. As mentioned earlier, one of the driving priorities of the human mind is to strive for meaning – we need to make sense of the world in order to function adequately. This is deeply rooted in the human psyche.

A belief common to most children and many adults is the 'just world hypothesis'. This presumes symmetry between mental processes and their outcome. Put simply, it is that bad things happen to bad people, and good things happen to the worthy. But this is not the way of the world – chance and other unforeseeable factors can ruin the best-laid plans. Conversely, good luck can turn a pig's ear or a bad plan into a silk purse.

One of the basic rules of error management is that the best people can make the worst errors. There are many reasons for this. The best people tend to push at the limits of existing practice by trying out new techniques. They are often in a supervisory capacity and are multi-tasking, thus easily distracted or preoccupied. In the maintenance world, for example, managers sometimes elect to carry out 'hands on' tasks ill-advisedly in order to avoid being de-skilled.

Another widespread myth is that errors occur 'out of the blue' and are highly variable in their form. Neither is the case. Errors are not random and they take recurrent and predictable forms. Different errors occur in different situations, as indicated below:

- Errors happen when you know what you are doing – that is while carrying out a routine task in familiar circumstances – but the actions don't go as planned. These errors take the form of systematic 'absent-minded' action slips and memory lapses. They can also appear as trips, fumbles and stumbles.
- Errors can also happen when you think you know what you are doing, as in dealing what appears to be a trained-for problem, but misapply a normally good rule; apply a bad rule; or fail to apply a good rule. These are rule-based mistakes and violations.

- And errors are certain to happen when you encounter a novel situation and are not sure what you are doing. These are knowledge-based mistakes and take a wide variety of forms. These error types will be discussed in more detail later.

Instances of these error types as they might appear, for example, in a medical context are listed below:

- A physician writes a prescription for 5 milligrams instead of 0.5 milligrams (a slip).
- A nurse delivers a dose of medication late (a lapse).
- A physician applies the wrong formula to adjust the dosage of amino-glucoside, an antibiotic drug, to be administered to a patient with renal problems (rule-based mistake).
- A junior doctor fails to make the above adjustment because he/she does not appreciate the requirement for moderating the dose for patients with kidney disease (knowledge-based mistake).

Another indication that errors are not random events is shown by the existence of recurrent error traps, where the same situations keep creating the same kinds of error in different people. I mentioned these earlier and they will be discussed further at various points throughout the remainder of this book.

In the rest of this chapter, I will unpack these three major categories of error and look at the various sub-categories within each one. We begin with 'absent-minded' action slips and memory lapses.

Slips and Lapses

I find it convenient to sub-divide these execution problems into three main types: recognition failures, memory failures and attention failures.

Recognition Failures

These fall into three main categories:

1. *The misidentification of objects, message, signals, and the like:* expectation plays a strong part in these errors. Train drivers, for example, occasionally perceive a red signal aspect as green,

because they have been accustomed to meeting a green aspect at that point. Such errors have had catastrophic consequences (the Harrow train disaster in 1952). Other contributing factors are similarity – in appearance, location, function and the like – between the right and the wrong objects or signals; poor signal-to-noise ratios – indistinctness, poor illumination, ambiguous sensory data – and strong habit – in well-practised and familiar tasks, perceptions become less precise: we sometimes accept a crude match to what is expected, even when it is wrong.
2. *Non-detections*: the failure to detect a signal or problem (a false-negative). Aside from lack of training and inexperience, these errors are more likely under the following conditions: the inspection was interrupted before reaching the defect; the inspection was completed but the individual was preoccupied, tired or in a hurry; the person did not expect to find a problem in that location; one defect is spotted but another, close to it, is missed; access to the task was unsatisfactory.
3. *Wrong detections (false positives)*: this involves wrongly detecting problems or defects that were not actually present. Many systems, however, are designed to be fairly tolerant of false-positives – better to be safe than sorry. However, when this principle is applied in a military defence system, the results can be catastrophic. False alarms play a large and dangerous part in eroding the trust operators have in their warning and alarm systems.

Memory Failures

Slips and lapses can arise at one or more of the following information-processing stages: input in which insufficient attention is given to the to-be-remembered material and it is lost from short-term memory; storage in which the to-be-remembered material decays or suffers interference in long-term memory; and retrieval when known material is not recalled at the required time (e.g., tip-of-the-tongue states).

Input Failures

What are we most likely to forget on being introduced to someone? It is his or her name. Why? Because the name is part of a torrent of new information about this person and often fails to get taken

in unless we make a special effort to focus on the name – and then we often forget aspects of their appearance and what they did for a living. This shows, once again, that the right amount of attention is an important precondition to being able to remember it later.

A second kind of input failure is the forgetting of previous actions. Again, this is due to a failure of attention: the information simply wasn't encoded. When we are doing very familiar and routine tasks, our conscious minds are almost always on something other than the job in hand. This relative inattention is a necessary feature for the task to be done smoothly; conscious 'interrogations' of habitual actions disrupt. For example, it would be unwise to concentrate on what your feet were doing when running down stairs two at a time. Because our minds are on other things we 'forget' where we put things down, or find ourselves walking around looking for something that we are still carrying.

Another consequence of this kind of forgetting is losing our place in a familiar series of actions – we 'wake up' and don't know immediately where we are in the sequence (see earlier). And there is also the 'time-gap' experience where we can't remember where we have been driving or walking in the past few minutes, or what exactly we have been doing. For example, we can be showering and not remember whether or not we have put shampoo onto our hair. The evidence (if there was any) has been washed away while our mind was 'absent' from the details of the task.

Storage Failures

Perhaps the commonest of these is forgetting intentions. An intention to do something is rarely put into action immediately. Usually it has to be held in memory until the right time and place for its execution. Memory for intentions is called prospective memory, and it is particularly prone to forgetting or sidetracking, so that the action is not carried out as intended.

It is, of course, possible to forget an intention so that no trace of it remains. More usually, however the forgetting occurs in degrees. These different levels of forgetting are listed below:

- *Forgetting the plan*: almost complete forgetting leads to the vague 'I-should-be-doing-something' feeling. Here you have an uneasy sense that you should be carrying some action, but can't remember what or where or when it should be done.
- *The 'what-am-I-doing-here?' feeling*: This is a fairly common experience when you initially remember the intention and start to carry it out, but somewhere along the line (usually because you are preoccupied with something else or are distracted) you forget what it is you came to some place to do. You can find yourself looking into an open drawer or refrigerator, or standing at a shop counter, and your mind is a blank. The intention has been lost – although you can be reminded of it shortly afterwards.
- *Forgetting items in a plan*: here you set out to perform a plan of action, think that you've completed it, but later discover you've left something out. A common experience is to return home to find a letter you had meant to post still on the hall table. It is also my experience that it is quite easy to forget things that other people have asked you to do.

Retrieval Failures

This can take very embarrassing forms as in trying to introduce a person whose name you know well, but at the moment of saying it your mind is a blank. It's the 'this-is – er' experience. As a lecturer, I have frequently said something like 'I have three points to make', and then find that I can't recall the third (or even the second) point. We have already discussed the more private tip-of-the-tongue (TOT) experience. Our studies showed that these TOT states can last quite a long time, but in the end they get resolved in one of three ways: the lost word or name appears as the result of a deliberate search, usually the last of many attempts; the searched for item can pop into your mind out of the blue, usually when you are doing some routine job like washing up or vacuuming; and it could be that a TV programme or newspaper or some other external source mentions the word or name and you recognise it as the item you have been searching. Each of these three ways of concluding a TOT state is equally likely.

There can be little doubt that retrieval failures occur more commonly as you grow older – unlike other slips and lapses which surprisingly occur more frequently in the young, perhaps because we rely more and more on memory aids (lists, calendars, post-it notes, knots in handkerchiefs, and the like) as we age.

Nominal aphasia – not being able to say a name that you know you know – is hardly surprising. Names no longer have much in the way of semantic content. Once upon a time Mr Baker was a baker; but it is not usual nowadays. Having a name like 'Reason' is a mixed blessing. One is subjected to all kinds of oft-heard puns, particularly if you happen to be a professor of psychology; the upside, however, is that people tend to remember the name. On balance, the plus side wins out.

Attention Failures

As noted earlier, attention is a limited resource. Direct it at one thing and it is withdrawn from another. When attention is 'captured' by something unrelated to the task in hand, actions often proceed unintentionally along some well-trodden pathway: strong habit intrusions.

Strong habit intrusions Approximately 40 per cent of all absent-minded slips are of this kind. They take the form of intact, well-organized sequences that recognisably belong to some activity other than the one that is currently intended. This other activity is judged as being recently and frequently engaged in, and as sharing similar, locations, movements and objects with the intended actions.

Absent-minded slips are most likely to occur in highly familiar and relatively unchanging surroundings – kitchens, bathrooms, bedrooms, offices and the like – and during the performance of well-practised tasks that were rated as being recently and frequently performed, and largely automatic in their execution.

Another factor is the inappropriate deployment of the limited attentional resources at some critical choice point in the action sequence. For the most part this involves attentional capture by external distraction or internal preoccupation. But there are occasions when too much attention is directed at some largely automatic action sequence. This usually involves a 'where am I?' query following an interruption. Two wrong answers can ensue: either that I was not as far along as I actually was – resulting in a repetition – or that I was further along – resulting in an omission.

In addition to the general disposing conditions mentioned above, there are at least four more situations in which strong habit intrusions are likely to occur:

1. When a change of goal demands a departure from some well-established routine.
2. When changed local conditions require a modification of some familiar and oft-performed action sequence.
3. When a familiar environment associated with a particular set of behavioural routines is entered in a reduced state of intentionality. For example, we could stray into the bathroom and clean our teeth, even though this was not intended.
4. When features of the present environment contain elements similar or identical to those in highly familiar circumstances. (For example: 'As I approached the turnstile on my way out of the library, I pulled out my wallet as if to pay – although I knew no money was required.')

Strong habit intrusions are extremely widespread, and sometimes disastrous. In the summer of 1982, a double-decker bus on a country route in Wales sheared off its top deck when attempting to pass under a low railway bridge, killing six people. At the coroner's inquest, the driver said: 'It was not in my mind that I was driving a double-decker bus.' He had taken a route he normally drove with a single-decker bus. Other strong habit intrusions have been implicated in the Ludlow (1956) and Lewisham (1957) train crashes, and the calamitous runway collision at Tenerife in 1977.

Interference errors Interference errors result from 'crosstalk' between two currently active tasks (blends and spoonerisms), or between elements of the same task (reversals or spoonerisms). A typical blend is when elements from the previous task carry over into the next. (For example: 'I had just finished talking on the phone when my secretary ushered in some visitors. I got up from behind the desk and walked to greet them with my hand outstretched saying "Smith speaking".') A reversal is when the actions are correct, but the objects for which they were intended

get transposed. Consider the following account published in the *Spectator* of 1711:[1]

> My friend Will Honeycombe is one of the Sort of men who are very often absent in conversation . . . A little before our Club-time last night we were walking together in Somerset Garden, where Will picked up a Pebble of so odd a make, that he said he would present it to a Friend of his. After we had walked some time, I made a full stop with my Face towards the West, which Will knowing this to be my usual method of asking what's o'Clock in an Afternoon, immediately pulled out his Watch and told me we had seven Minutes good. We took a turn or two more, when, to my great Surprise, I saw him fling away his Watch a considerable way into the Thames and with great Sedateness in his Looks put the Pebble, he had before found, in his Fob. As I have naturally an aversion to much Speaking, and do not love to be the Messenger of ill News, especially when it comes too late to be useful, I left him to be convinced of his mistake in due time and continued my Walk. . . .

There is a close resemblance between action slips and the errors we find in other domains of mental function, particularly speech. The similarity between the behavioural spoonerisms and slips of the tongue is obvious. Will Honeycombe's error was clearly of the same kind as those attributed to the Reverend W.A. Spooner who is purported to have said such things as 'queer old Dean' when he meant to say 'dear old Queen'.

Other very similar errors also occur in both speech and action; for example, the 'premature exits' from action sequences are closely comparable to the familiar actor's error of being triggered unwittingly into speaking lines from the second act by a similar combination of words in a first act speech. These anticipatory errors also happen quite frequently in everyday speaking and writing.

Let me conclude this section on slips and lapses by summarising three general factors that are involved in promoting these absent-minded errors:

- The *performance of a routine habitual task in familiar surroundings.* Paradoxically, absent-mindedness is the penalty we pay for being skilled; that is, for being able run off our routine actions in a largely automatic fashion.

1 Bond, D.F. (1965) *The Spectator Vol. I.* Oxford: Clarendon Press (pp. 329–330).

- *Attentional capture by preoccupation or distraction.* This capture happens when almost all of the limited attentional resource is devoted to one thing. If it is an internal worry, we call it preoccupation; if it is something happening in our immediate vicinity, we call it distraction.
- *Change, either in the plan of action or in the surroundings.* If no change had occurred, then the actions would have run along their accustomed tracks as intended. Change, of any kind, is a powerful error producer.

Rule-based Mistakes

As stated earlier, human beings are furious pattern matchers. When confronted with an unplanned-for situation we are strongly disposed to identify a familiar pattern and, where necessary, apply a problem-solving rule that is part of our stock of expertise. But these pattern-matching and rule-applying processes can be in error. Rule-based mistakes take three basic forms:

1. We can misapply a normally good rule because we fail to spot the contra-indications. (For example: a GP fails to identify that a child with a fever in a flu epidemic has meningitis.)
2. We can apply a bad rule. (For example: The technician involved in rewiring a signal box just prior to the Clapham rail disaster had acquired the habit of bending back the old wires rather than removing them.)
3. We can fail to apply a good rule. Standard operating procedures (SOPs) usually embody good rules. Failing to comply with SOPs can be both an error and a violation. We will discuss violations in the next chapter.

Knowledge-based Mistakes

Knowledge-based mistakes occur in entirely novel situations when we have run out of pre-packaged problem-solving rules and have to find a solution 'on the hoof'. These are highly error-provoking conditions; indeed, it is usually only trial-and-error learning that leads us eventually to an answer. The errors act

like runway markers to mark out the scope of allowable forward progress.

Mistakes at both the rule-based and the knowledge-based levels are shaped by a variety of biases. Here are some of them:

- *Similarity bias*: far from being random, errors tend to take forms that correspond to salient aspects of the problem configuration. Confirmation bias is the product of both similarity bias and bounded rationality (see below) during problem solving.
- *Frequency bias*: when cognitive operations are under-specified (see below), they tend to take contextually appropriate, high frequency forms.
- *Bounded rationality*: the conscious workspace is extremely limited in its capacity. This makes it liable to 'spillage' and overload.
- *Reluctant rationality*: The principle of 'least effort' acts to minimise cognitive strain. This means that we have a strong preference for automatic, parallel processing, even when the conditions demand computationally powerful but effortful serial processing. We are not always aware of the extent to which we employ these unconscious processes in lieu of conscious thinking.
- *Irrationality*: this is an over-used explanation of mistakes, but there can be little doubt that group dynamics can introduce genuine irrationality into the planning process. What could be more irrational than the wilful suppression of knowledge indicating that a certain course of action will lead to disaster?

Conclusion: A General Rule

If there is one principle that governs the shape of nearly all types of human error, slips, lapses and mistakes, it is *under-specification*. Errors arise when the mental processes necessary for correct performance are incompletely specified. These under-specifications take many forms: inattention, forgetting, incomplete knowledge, ambiguous sensory data, and the like. Fortunately, although under-specification can take many forms, the mind's response is very predictable. It 'defaults' to a response that is frequent, familiar and appropriate for the context. This is very adaptive. When in doubt, our mental processes resort to a response that has proved itself to be useful under these

particular circumstances – and that means that it is something that is frequently (and often recently) employed in this context. This is psycho-logic: it may not be correct, but it is very sensible when one is forced to guess.