3 Heider's analysis of naive psychology

Heider (1958) assumes that the intuitive or naive psychologist uses two groups of concepts for the explanation of behavioural outcomes. The first group consists of factors that are conceived of as residing within the person, and the second group of factors residing within the environment (see Figure 3). This basic assumption is consistent with the assumption of scientific psychology, which also assumes that behaviour is a function of the person and the environment (see, e.g., Lewin, 1935).

Heider (1958) assumes that the personal factors that the naive psychologists make responsible for a behavioural outcome (such as success or failure) consist of both a relatively stable cause (power or ability) and a relatively variable and controllable one (such as motivation and intention). Most readers will recall instances when they have wondered whether success or failure were primarily due to effort or to ability, and also, in scientific psychology, motivation and intelligence are considered to be the major personal determinants of achievement. Furthermore, empirical research (see Elig & Frieze, 1979) has shown that, in fact, ability and effort are conceived of as the main determinants of achievement by most individuals in most cultures.

Figure 3 also illustrates that the effective force of the environment consists—according to Heider—of a relatively stable factor (the difficulty of the task) and a variable component (chance). He assumes that behavioural outcomes such as successes and failures can be attributed to external factors such as the ease (success) or the difficulty (failure) of the task and to good (success) or bad (failure) luck.

The relation between perceived ability and the effective force of the environment constitutes, according to Heider (1958) the naive

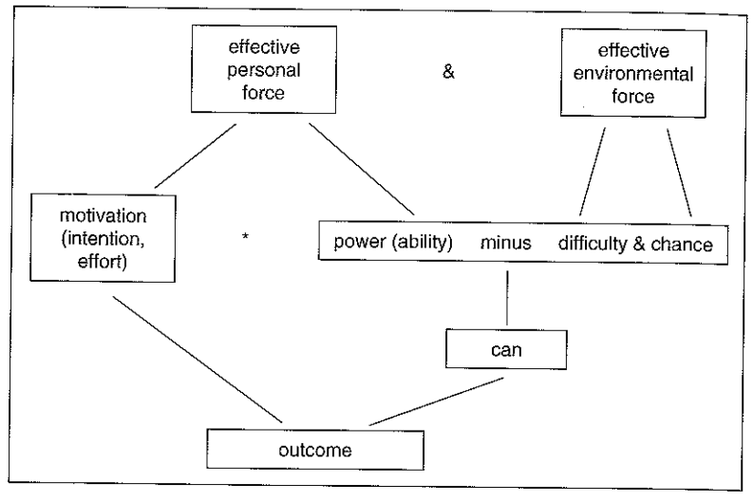

Figure 3. Determinants of an action outcome according to the naive psychology. (Reprinted with permission from Meyer and Försterling, 1993.)

concept of "can". We typically say that we "can" or another person "can" do something if we consider the person's (or our) ability to be greater than the effective force of the environment (e.g., the difficulty of the task).

Now that we have discussed the basic concepts of naive psychology, we can turn to the relations between these concepts. Figure 3 indicates that Heider proposes that the naive psychologist assumes a multiplicative relation between the concepts of motivation and power (ability). For instance, if one of the two causes is zero (i.e., the person has no ability or does not try at all) the outcome is expected to be zero as well. Moreover, a person with a certain ability level (say "2") who invests "2" units of effort and achieves an outcome of "4" should be expected to attain an outcome of "8" when increasing his effort from "2" to "4" ($2 \times 4 = 8$); had there been an additive relationship between effort and ability, an outcome of "6" would be expected.

With regard to the relation between the effective force of the person and the effective force of the environment, Heider postulates the naive psychologist to assume an additive relation. To illustrate, assume someone rows a boat "4" kilometres per hour (outcome) while there is a tailwind of "2" kilometres (task ease or difficulty) per hour. Now suppose that the tailwind increases to "4" kilometres (the effective force of the environment increases or, in other words, task difficulty decreases), and that the rower exerts the same effort and possesses the same ability as before. Heider would expect that the additive relation that characterises the naive scientist's assumption

about the relation between the effective force of the person and the environment would lead him to estimate the rower to make more kilometres within an hour (possibly 6 instead of 4; $4 + 2 = 6$) but not to expect him to double the distance as would be the case if there were a multiplicative relation (i.e., $4 \times 2 = 8$).

In addition, if the effective force of the environment (e.g., the wind) is "0" (i.e., there is no wind), then the time needed to row across the lake would be perceived to depend only on the effective force of the person (his ability and effort). By no means would the intuitive psychologist predict that the rower would not reach the other bank, as would be assumed when effort or ability decreased to zero. Similarly, Heider assumes that when the effective force of the person becomes "0", the outcome would not need to become "0" as well. Suppose the person in the rowing boat would not exert any effort at all and lose all his ability (effective force of the person = 0). In this case, a tailwind could still drift his boat to the other shore. However, according to Meyer (see Meyer & Försterling, 1993), it would be incorrect to label the event a behavioural outcome if a person had not tried at all.

The naive analysis of action allows individuals, according to Heider, to make several additional important inferences. For instance, if a person knows the behavioural outcome and the magnitude of one of the contributing personal causes (e.g., motivation), he can draw conclusions with regard to the second personal factor involved (i.e., effort). Suppose you find out that two persons have rowed a boat across the lake in 10 minutes and that one person has invested a great amount of effort whereas the other person has only exerted a minimum of effort. Who would you believe has more rowing ability? Most likely you will say that the person who achieved the same result with little effort has higher ability than the person who tried hard. This inference can be deduced from (the multiplicative relation) between effort and ability.

$$\text{Ability} = \text{performance:effort}$$

Similarly, you can infer how hard a person must have tried when you know the person's ability and the difficulty of the task. If you find out that two persons have rowed the boat across the lake in 10 minutes and you further know that one person is an Olympic rowing boat champion (high ability) whereas the other is an untrained clerk (low ability), you probably would come to the conclusion that the athlete has exerted less effort for achieving the same result as the untrained clerk. This conclusion would also be predicted by Heider's

model as depicted in Figure 3, and can formally be described as follows:

Effort = difficulty:ability

There exist only a few empirical studies with regard to Heider's naive analysis of action (see Anderson & Butzin, 1974; Shepperd, Arkin, Strathman, & Baker, 1994). However, we will once more refer to Heider's analysis of the naive analysis of action. In Chapter 7 we will see that Kelley has presented similar ideas when introducing his concept of causal schema.

Heider's naive analysis of action has highlighted how we can make inferences from the knowledge of an outcome and of a cause on a second—thus far unknown—cause. It also specifies how we can predict the outcome when we know one cause; the involved inferential processes appear like a "cognitive algebra" that consists of solving equations with one unknown. However, we have not yet discussed the conditions under which we trace back an effect to one of the causes as specified in Figure 3. The models in Chapter 4 address exactly this question: When do we attribute an effect to the person and when to the environment?

Refer to pages 40–41 for summary notes and exercise questions for this chapter.

4 Antecedents of phenomenal causality

All of the models that address the question of under what conditions one cause and under what conditions another cause is selected for the explanation of an event were guided by Heider's (1944, 1958) initial analyses. These analyses have several roots. In his early contributions, Heider was primarily concerned with phenomenal causality (see Eimer, 1987), that is, how we get the perceptual impression that one event causes the other (e.g., that the rain is the cause for the street getting wet). In these analyses Heider applied principles from Gestalt psychology to the investigation of phenomenal causality. As indicated in Chapter 1, philosophers had already pointed to the importance of the concepts of temporal and spatial contiguity for the impression of the causal relation between two events. In addition, Heider (1958) was interested in the conditions underlying attributions of "intent" or "motive". His ideas about this were later taken up by Jones and Davis (1965) and Jones and McGillis (1976). These authors have proposed the "theory of correspondent inferences". Finally, Heider (1958) was interested in causal inferences based on information; in this context, he referred to Mill's method of difference when articulating his covariation principle. These ideas, which were later taken up by Kelley (1967), laid the foundation of the most influential model of the antecedent conditions of causal attributions; and they are still being developed further.

In the present chapter, we will start with Heider's early Gestalt psychological work on persons as causes, and temporal and spatial contiguity. Then we examine the determinants of the attribution of intent, and, finally, we will introduce covariation-based models (which are discussed in detail in Chapter 6).

Persons as causes

Heider and Simmel (1944) assumed that persons—and especially their motives—are prone to be perceived as causes of events. Tracing back an event to the motives or the intention of a person has several advantages: According to Heider, personal motives are "final causes", and we are typically satisfied and do not ask further causal questions when we know that a person had the intention of bringing about the effect to be explained. A personal intention is a prototype of a cause in that it does not call for more distal explanations (see also Hart & Honoré, 1959). For instance, if you receive a present in the post, you are typically satisfied with the explanation that the giver had the intention to please you. On the other hand—to use another of Heider's examples—when you find plaster dust on your desk and can trace it back to a crack in the ceiling, you would not be satisfied with this explanation. You would typically continue your questioning and ask "Why is there a crack in the ceiling?" In addition, tracing an event back to a personal motive or intention allows one to structure a multitude of stimuli in a simple, parsimonious, and unifying manner; in other words, attributions to the person follow the Gestalt principle of "Prägnanz". For instance, the postman ringing your doorbell, the nice wrapping paper, and the beauty of the present are parsimoniously explained by tracing the present back to your friend's intention to please you.

The classical experiment by Heider and Simmel (1944) illustrates the general tendency to make attributions to personal motives and intentions. Participants watched movies that lasted for approximately 2.5 min and that depicted geometrical figures (see Figure 4). For instance, one movie depicted a large triangle, a small triangle, a circle, and a rectangle that had one section that occasionally opened or closed like a door (see also Eimer, 1987). The movie portrayed the

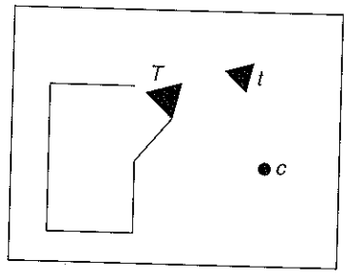

Figure 4. Geometrical figures used as stimulus material by Heider and Simmel (1944, p. 244). (From *American Journal of Psychology*. Copyright 1944 by the Board of Trustees of the University of Illinois. Used with the permission of the University of Illinois Press.)

triangles and the circle as moving in various directions at different speeds. After having watched the movie, experimental subjects were asked to write down "what they saw". The most important result of these experiments consisted of the finding that almost all individuals reported having seen "intentional actions of individuals or animals". Moreover, participants attributed personal traits (e.g., brave, strong, shy) to these "individuals". For example, one subject wrote the following description:

> Triangle number one shuts his door (or should we say line), and the two innocent young things walk in. Lovers in a two-dimensional world. No doubt, little triangle number two and sweet circle. Triangle one . . . spies the young love. Ah! He opens his door, walks out to see our hero and his sweet. But our hero does not like the interruption . . . he attacks triangle one rather vigorously (Heider & Simmel, 1944, p. 247)

This example illustrates how a multitude of objectively unconnected events (i.e., the movements of the geometrical objects) can be parsimoniously structured as a meaningful sequence when interpreted as the behaviour of persons with intentions and certain traits. The tendency to structure unconnected events in terms of personal intentions, however, can lead, according to Heider, to an underestimation of situational factors (this tendency has later been referred to as correspondence bias; see Chapter 8).

Temporal and spatial contiguity

As already indicated (see Chapter 1), the philosophers Ducasse (1924), Hume (1740/1938), and Mill (1840/1974) proposed that temporal and spatial contiguity are prerequisites of the impression that two events are causally connected. If we once again consider the example of a lightning striking a barn, it is clear that the judgement that the lightning caused the fire in the barn requires that the lightning preceded the burning of the barn in time, and it has to occur spatially close to the event. Otherwise, we would discard the lightning as a possible cause for the effect to be explained (lightning that struck last year in a different country is not held responsible for the burning of the barn here and now). In addition, the cause (lightning)

and the effect (burning of the barn) share important similarities: Both appear to "consist of fire". Hence, it would not be surprising if individuals entirely unaware of the laws of physics, who see for the first time lightning striking a barn, attributed the burning of the barn to the lightning rather than, for instance, to the thunder.

The philosophical ideas about causality have been taken up by Gestalt psychologists, most importantly by Heider and Simmel (1944) and Michotte (1946). Heider and Simmel not only demonstrate how the tendency to structure ambiguous events in terms of personal causation influences causal perceptions; they also point out situational determinants of perceived causality. For instance, consider the following "scenario" that was depicted in one of the movies: A big triangle (T) moves with constant speed towards a stationary small triangle (t) until it touches it. Then, T stops and, upon being touched, t starts moving in the same direction in which T used to move. In this sequence, the observer gets the impression that T is the cause of the subsequent movement of t, or, in other words, that kinetic energy is transferred from T to t.

This sequence of the movie is characterised by the three determinants of perceived causality to be discussed in the present section: Spatial contiguity (T moves towards and touches t before t starts to move), temporal contiguity (T touches t shortly before t starts to move), and similarity (t moves into the same direction as T).

The findings of Heider and Simmel (1944) were quite similar to the findings of Michotte's (1946) experiments. Michotte was not interested in the attribution of traits or in the tendency to see persons as primary causes. Instead, Michotte investigated under what circumstances individuals get the phenomenal impression that one event causes another. In these studies, a red and a black disk (A and B) were presented on a screen. In some of the experiments, A moved—as did the triangle in Heider and Simmel's aforementioned study—towards B and "bumped" into it. If B immediately moved following contact, subjects reported having the impression that B's movement was caused by A's movement. Michotte varied in his experiment the time period between A's contact with B and B's "departure". It was found that when the interval between A's contact and B's departure was equal to 75 ms or less, an impression of direct launching was reported by the subjects. An impression of "delayed launching" was reported when the time interval between the two movements of A and B was around 100 ms; and if the delay lasted more than 200 ms, subjects no longer reported the impression that A was causally responsible for B's movement.

To summarise, early experiments conducted by Heider and Simmel (1944) and by Michotte (1946) within the framework of Gestalt psychology took up a notion originally voiced by philosophers (e.g., Ducasse, 1926; Hume, 1740/1938; Mill, 1840/1974) that temporal and spatial contiguity as well as similarity are essential "cues" for causality. Michotte (1946) demonstrated this especially for the realm of causality perception within the physical domain. He investigated under what circumstances the movement of one object is seen as a cause for the movement of another object. Heider and Simmel (1944) additionally investigated the tendency to attribute personal causality to the inanimate objects applying the rules of phenomenal causal perceptions of physical objects to social perception.

Refer to pages 40–41 for summary notes and exercise questions for this chapter.

5 Antecedents of attributions to intention

As documented in the experiments of Heider and Simmel (1944), the attribution of behaviour to the intentions of the actor are of special importance in the psychology of the "man on the street": When we know that a person has intentionally performed a certain act, we will see this behaviour as indicative of his/her character or of other stable dispositions. Behaviours that we attribute to the demands of the situation or to chance do not provide us with such information about the person and would not assist us in predicting how he/she is going to behave in the future. Also recall that "intentions" are, according to Heider, "final causes". We typically do not ask further causal questions once a free personal decision to perform an act has been identified as the cause of behaviour. Two concepts have been introduced that specifically address the question as to when we attribute a person's behaviour to his or her intention: Heider's (1958) concept of equifinality and Jones and Davis' (1965) theory of correspondent inferences. These approaches will be described in the following sections.

Equifinality

In his monograph, Heider (1958) analysed the antecedent conditions of attributions of intention or motive, for example, when we assume that a man who is travelling in the same bus has intentionally trodden on our foot and when we accept his behaviour as being accidental.

According to Heider, information about equifinality or multifinality and about the presence of local causality is examined in order

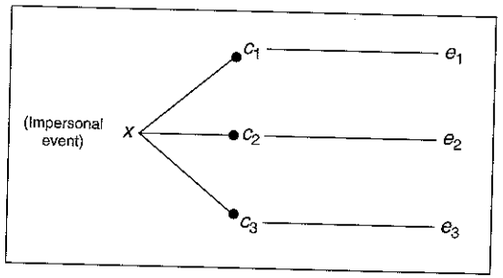

Figure 5. Multifinality given impersonal causality. Based on Heider, 1958.

to decide between intentional (personal causality) and non-intentional (impersonal causality) causes.

Figure 5 provides a graphic presentation of the state of multifinality that Heider assumes to be a condition of impersonal causality: Every time the individual shows a behaviour (x) (e.g., he gets on the bus), this behaviour leads to different effects (e) in different situations or on different occasions (C). Suppose you observe person (P) on different days (C1, C2, C3) getting on the bus (behaviour x). If he steps on a person's foot (e1) on the first day (C1), trips over another passenger (e2) the second day (C2), and gets on the bus without any difficulties (e3) the third day (C3), we will probably not be inclined to attribute the effect (e1, that he trod on the other individual's foot) to intention.

In contrast, Figure 6 presents the state of equifinality that should lead to attributions of intent. Equifinality means that the behaviour (x) of a person (P) under different conditions (C1, C2, C3) leads to identical effects (e1). If our passenger (P) treads on the person's foot on different occasions (C1, C2, C3), we will attribute to him the intent of harming the individual, as the passenger changes his behaviour in accordance with the situative conditions as necessary to achieve his goal (e1).

However, Heider points out that equifinality can be observed in physical systems in addition to fields of human behaviour. He offers the example of a ball in a bowl. Regardless of the position in which the ball starts rolling (C1, C2, C3), it will always come to rest at the lowest point in the bowl (e1). In such cases, of course, we do not talk about the ball as having a "motive" or an "intent" to "strive" toward the deepest part of the bowl. In this case, the second precondition for the attribution of motives or intents as formulated by Heider has yet to be fulfilled: No local causality is present. The forces that always make the ball stop at the same position in the bowl are not found only in the ball (only then would we talk about local causality), but rather

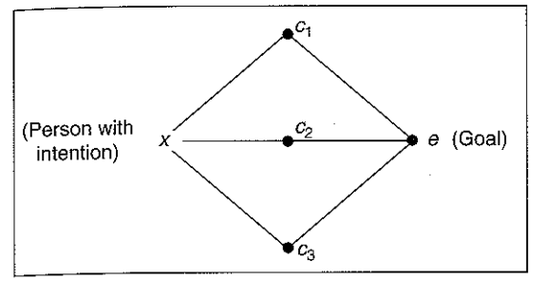

Figure 6. Equifinality given personal causality. Based on Heider, 1958.

are a part of the entire physical system. Local causality is only given if the forces necessary to achieve the goal (e1) are localised in the person who is performing the activity.

Note that in this analysis of the antecedents of attributions to intentional behaviour, Heider has left the concept of phenomenal causality that is determined, according to Gestalt psychology, by temporal and spatial contiguity. Instead, multiple observations of co-occurrences of effects with behaviour are outlined as a determinant of attributions to intentions. Hence, unlike Heider's early work (Heider & Simmel, 1944) that focuses on the determinants of "phenomenal causality", his later work was guided by an interest in inferred causality (see Eimer, 1987) that necessitates multiple observations.

Correspondent inferences

Jones and Davis (1965) were guided by Heider's ideas about the attributional inferences that can be drawn from the effects of behaviours. Their theory of correspondent inferences focuses on how laypersons make judgements about the dispositions of other persons; more specifically, it is concerned with the psychological processes that determine how a perceiver uses an actor's specific behaviour to infer the dispositions of that actor (see Figure 7).

Figure 7 summarises the constructs and processes the perceiver engages in to arrive at a dispositional attribution. These processes involve observations as well as inferences. The model addresses a situation in which a perceiver observes another person's action and some of its effects. For instance, the perceiver might observe both that the actor married her partner (action) and that this action has a variety of effects on her. One effect may be that the choice of the partner leads to an increase in her monetary wealth (effect 1); another