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## Subgoal Scaffolding

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### Definition

Subgoal scaffolding theory was proposed as a more nuanced account of the processes of the *behavioral approach system* (BAS), which is one of the major components of the well-known reinforcement sensitivity theory (RST) of personality. Subgoal scaffolding theory delineates the separate, and sometimes opposing, BAS aspects which contain both heterogeneity and complexity of goals and processes. It is especially concerned with the cascade of processes along the temporospatial gradient from *start goal state* (i.e., exploration of a potentially rewarding environment) to the *final goal state* (i.e., attaining the end reward). As operationalized in the Reinforcement Sensitivity Theory Personality Questionnaire (RST-PQ; Corr and Cooper 2016), this cascade entails reward interest, goal-drive persistence, reward reactivity, and impulsivity, where behavioral caution is more appropriate at the early states and impulsive reacting at the later stages of the cascade.

## Introduction

As originally proposed by Corr (2008), subgoal scaffolding theory offers a more nuanced account of the processes of the *behavioral approach system* (BAS), which is responsible for mediating reactions to appetitive stimuli and is related to states associated with hopeful anticipation, optimism, and generally reward sensitivity. The BAS is one of the major components of the well-known reinforcement sensitivity theory (RST) of personality – the other two systems are the *fight-flight-freeze system* (FFFS, responsible for mediating defensive reactions to all aversive stimuli and related to the state of fear) and the *behavioral inhibition system* (BIS, responsible for the detection of goal conflict and for initiating cautious approach behavior and related to the state of anxiety).

### Temporospatial Gradient

Subgoal scaffolding theory recognizes that the primary function of all approach behaviors is to move the animal along a temporospatial gradient, from the *start goal state* to the *final goal state* of the desired reward. The cascade of these motivational processes requires a form of problem solving – as such, the theoretical elaboration of subgoal scaffolding was inspired by the cognitive psychology literature, starting with the types of cognitive operations discussed by Miller et al. (1960). These authors reasoned that behavior is guided by plans and goals and (self-)regulated by

discrepancy-reducing feedback processes. More specifically, as Anderson (1985, p. 198) stated: “Problem solving is defined as a behavior directed toward achieving a goal [and it] involves decomposing the original goal into subgoals and these into subgoals until subgoals are reached that can be achieved by direct action.” As with BAS-related goals, as Anderson (p. 198) went on to state: “The problem space consists of physical states or knowledge states that are achieved by the problem solver. The problem solving task involves finding a sequence of operators to transform the initial state into a goal states, in which the goal is achieved.” Subgoal scaffolding couches these cognitive operators into motivationally salient ones.

Subgoal scaffolding theory delineates the separate, and sometimes opposing, aspects of the heterogeneity and complexity of BAS goals and processes, comprising reward interest, goal-drive persistence, reward reactivity, and impulsivity. Individual differences in the traits of these BAS processes, as well as the FFFS and BIS, are measured in questionnaire form by the *Reinforcement Sensitivity Theory Personality Questionnaire* (RST-PQ; Corr and Cooper 2016). The major impetus for the formulation of subgoal scaffolding theory was the recognition that approach behavior is much more complex than commonly assumed and certainly more so than FFFS/BIS-related defensive behavior.

### Approach Behavior Heterogeneity

Approach behavior complexity comes from the heterogeneity of both its goals and processes. One useful way to view this is through the lenses of the “arms race” between predator and prey. The “life-dinner principle” (Dawkins and Krebs 1979) states that the evolutionary selection pressure on prey is much stronger than on the predator. If a predator fails to kill its prey, it has lost its dinner, but things are very different if the prey fails to avoid/escape being the predator’s dinner: it has lost its life. For sure, there is some complexity in defensive behavior (e.g., depending on situational constraints, freezing, fleeing, and defensive attack), but not to the same extent as approach behavior.

In even a simple predator-prey situation, the predator needs to use approach behavior to achieve its appetitive aims, and this must entail a high degree of cognitive and behavioral sophistication. (It is relevant to note here that “fight” and “aggression” have been consistently associated with BAS factors in questionnaire studies, which lends support to the predator nature of BAS processes; see Corr 2016.) This heterogeneity of approach behavior is seen in the form of big cat species stalking their prey: they require a combination of stealthful approach, characterized by behavioral restraint, and then, explosive attack. Certainly, in the case of human beings, approach behavior is no less complex.

Added to this complexity of processes, and once more in contrast to defensive behavior, there is heterogeneity of appetitive goals (e.g., securing food, finding/keeping a sexual mate, financially planning for the future, establishing and maintaining reputation – and this is a very long list) which demand a corresponding heterogeneity of BAS-related strategies. In particular, rash and impulsive behavior would be counterproductive – “. . . unfettered impulse can interfere with the attainment of longer term goals” (Carver 2005, p. 312). But, at the final point of capture of the reward, fast, impulsive action is appropriate and, indeed, necessary, as overcontrol of BAS-driven impulses can lead to lost opportunities.

### Everyday Example: Sales

An everyday example illustrates these BAS processes. Consider the salesperson – Barrick et al. (2001) showed that sales performance is related to BAS-related approach behavior – who is required to employ many different approach strategies to achieve their ultimate goal. They need to prepare a sales pitch, deliver the presentation, deal with objections, negotiate, and, finally, “close” the sale. The main point is that there is a cascade of tasks, each with their own (local) objectives, as well as the reinforcement structure to maintain them: receiving reinforcement throughout this process is necessary to maintain motivation –

these serve as a form of *temporal bridging*. Failure to navigate successfully through these various stages leads to, among other things, dysfunctional, often impulsive, behavior and, thus, a failure to achieve the supraordinate approach goal, which in this case is making a sale. Both the *sequence* of tasks and *appropriate* behaviors during them are important.

More specifically, it can be seen that in the case of (successful) sales behavior, to move along the relevant temporospatial gradient to the final goal state, subgoal scaffolding along the following lines is needed: (a) identifying the final outcome (e.g., closing the sale to achieve commission), (b) planning behavior (e.g., preparing sales pitch), and (c) executing the plan (i.e., performing in the sales situation). Therefore, these *approach* behaviors lead to the final desired reinforcer outcome (e.g., making the sale) by entailing a series of subprocesses, some of which oppose each other. Examples of potentially conflicting subprocesses include pressuring versus listening to the customer. In these processes, the involvement of another RST system is important: the BIS, which detects goal conflicts and would motivate the sales person to identify obstacles to the sale (e.g., points of customer resistance which need to be identified and countered). Some degree of BIS-related risk assessment and rumination would help the sales person to appraise the situation and to avoid prematurely and unsuccessfully trying to close the sale. However, at some point, the sales person must press for the sale and not dither endlessly in an overcautious manner. (The relationship between RST-defined personality types and behavior in the workplace is discussed by Corr et al. 2016.)

As this sales example illustrates, in most approach situations, at the early stages, relatively unstructured exploration is often desirable to identify new opportunities – this is called “reward interest” in the RST-PQ (Corr and Cooper 2016). For the salesperson, this would entail the identification of new sales “leads.” Once the rewarding goal has been identified, then to pursue it effectively needs perseverance which is maintained by local rewards (e.g., feeling good after finding a sales lead or completing the preparation of a sales

presentation) – in the RST-PQ, this is called “goal-drive persistence.” The potential danger here is getting stuck on a “local high” and to substitute such *local* reinforcements for the final goal – this is one of the major reasons why even the best laid plans may not achieve their ultimate end. During all of the early stages of building toward obtaining the final goal, in most human situations, behavioral restraint is required, and impulsive responding must be curbed. However, to be motivated to work toward the final goal state, the animal (including the human being) needs to be sensitive to reward – this is called “reward reactivity” in the RST-PQ: being anhedonic would severely impair approach behavior, as too would being overly hedonic because the local reinforcement may too easily substitute for the end goal state. Then, once the sale is within easy reach, as it were, behavioral restraint and caution can be abandoned, and “impulsive” behavior is now adaptive – this is called “impulsivity” in the RST-PQ. Of course, in the case of humans, this behavior must be appropriate to the context and social convention, and failure to conform to these would, typically, thwart the aim of achieving the final goal state.

## Wanting and Liking

A useful way of thinking about the above processes is the distinction between “wanting” and “liking” (Berridge et al. 2009). The BAS is activated by stimuli that signal the possibility of achieving a reward, and it generates approach behavior, along with the accompanying states of desire, eagerness, excitement, and hope – this can be identified with the “wanting” system. In contrast, the “liking” system, which is akin to a “pleasure system” (PS), is engaged at the later stages of approach behavior. The PS responds to obtaining reward with subjectively experienced states of well-being. The PS, itself, can then act as a form of reinforcement: it serves the function of forming in memory a representation of the reward stimulus, and this strengthens the association of the stimulus with future approach opportunities. Indeed, it may serve a subjective “kindling”

function, triggering approach behaviors in the absence of immediately obvious rewarding opportunities. It may be useful to think of the wanting and liking systems as overlapping; however, if the liking system achieves influence too early in the temporal sequencing, then the necessary behavioral restraints may be overridden and approach behavior become rash, impulsive, and dysfunctional – this is what is seen in various forms of externalizing disorders (e.g., substance abuse, aggression, and disinhibitory syndrome).

## Conclusion

Something along the lines of subgoal scaffolding would seem essential for the reward-sensitive BAS to engage the necessary motivational, cognitive, emotional, and behavioral processes necessary to take the organism from an initial state of exploratory interest to the final object of reward. In most approach situations, there is a cascade of processes, some of which are opposing (e.g., caution vs. impulsivity), and orchestration of these processes is essential to rise to the challenges of the BAS approach behavior.

## Cross-References

- ▶ [Behavioural Approach System \(BAS\)](#)
- ▶ [Liking](#)
- ▶ [Pleasure System](#)
- ▶ [Reinforcement Sensitivity Theory](#)
- ▶ [Wanting](#)

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