***Encyclopedia of Personality and Individual Differences***

**Title of entry: Sub-Goal Scaffolding**

**Synonyms:** none

**Definition**

Sub-goal scaffolding theory was proposed as a more nuanced account of the processes of the *behavioural approach system* (BAS), which is one major component of the well-known reinforcement sensitivity theory (RST) of personality. Sub-goal 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 temporo-spatial 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 & Cooper, 2016), this cascade entails Reward Interest, Goal-Drive Persistence, Reward Reactivity, and Impulsivity, where behavioural 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), sub-goal scaffolding theory offers a more nuanced account of the processes of the *behavioural 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 *behavioural inhibition system* (BIS, responsible for the detection of goal-conflict and for initiating cautious approach behaviour, and related to the state of anxiety).

***Temporo-spatial gradient***

Sub-goal scaffolding theory recognizes that the primary function of all approach behaviour is to move the animal along a temporo-spatial gradient, from *start goal state* towards 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 sub-goal scaffolding was inspired by the cognitive psychology literature, starting with the types of cognitive operations discussed by Miller, Gelanter and Pribram (1960). These authors reasoned that behaviour 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.” Sub-goal scaffolding couches these cognitive operators into motivationally salient ones.

Sub-goal 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 & Cooper, 2016). The major impetus for the formulation of sub-goal scaffolding theory was the recognition that approach behaviour is much more complex than commonly assumed and certainly more so than FFFS/BIS-related defensive behaviour.

***Approach Behaviour Heterogeneity***

Approach behaviour 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 & 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 behaviour (e.g., depending on situational constraints, freezing, fleeing and defensive attack), but not to the same extent as approach behaviour.

In even a simple predator-prey situation, the predator needs to use approach behaviour to achieve its appetitive aims, and this must entail a high degree of cognitive and behavioural 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 behaviour is seen in the form of big cat species stalking their prey: they require a combination of stealthful approach, characterised by behavioural restraint and, then, explosive attack. Certainly, in the case of human beings, approach behaviour is no less complex.

Added to this complexity of processes, and once more in contrast to defensive behaviour, 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 behaviour would be counter-productive — “…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 over-control of BAS-driven impulses can lead to lost opportunities.

**Everyday Example: Sales**

An everyday example illustrates these BAS processes. Consider the sales person – Barrick, Mount and Judge (2001) showed that sales performance is related to BAS-related approach behaviour - 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, behaviour and, thus, a failure to achieve the supra-ordinate approach goal, which in this case is making a sale. Both the *sequence* of tasks and *appropriate* behaviours during them are important.

More specifically, it can be seen that in the case of (successful) sales behaviour, to move along the relevant temporo-spatial gradient to the final goal state, sub-goal scaffolding along the following lines is needed: (a) identifying the final outcome (e.g. closing the sale to achieve commission); (b) planning behaviour (e.g., preparing sales pitch); and (c) executing the plan (i.e., performing in the sales situation). Therefore, these *approach* behaviours lead to the final desired reinforcer-outcome (e.g., making the sale) by entailing a series of sub-processes, some of which oppose each other. Examples of potentially-conflicting sub-processes 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 over-cautious manner. (The relationship between RST-defined personality types and behaviour in the workplace is discussed by Corr, McNaughton, Wilson, Burch, & Poropat, 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 & Cooper, 2016). For the sales person, this would entail the identification of new sales ‘leads’. Once the rewarding goal has been identified then to pursue it effectively needs perseveration 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 towards obtaining the final goal, in most human situations, behavioural restraint is required, and impulsive responding must be curbed. However, to be motivated to work towards 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 behaviour, 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, behavioural restraint and caution can be abandoned, and ‘impulsive’ behaviour is now adaptive - this is called ‘Impulsivity’ in the RST-PQ. Of course, in the case of humans, this behaviour 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, Robinson, & Aldridge, 2009). The BAS is activated by stimuli that signal the possibility of achieving a reward, and it generates approach behaviour, 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 behaviour. 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 behaviours 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 behavioural restraints may be overridden and approach behaviour become rash, impulsive and dysfunctional – this is what is seen in various forms of externalising disorders (e.g., substance abuse, aggression, and disinhibitory syndrome).

**Conclusion**

*Something* along the lines of sub-goal scaffolding would seem essential for the reward sensitive BAS to engage the necessary motivational, cognitive, emotional and behavioural 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 behaviour.

**Cross-References:** reinforcement sensitivity theory; behavioural approach system (BAS); liking; wanting; pleasure system

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