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achievement motivation Achievement motivation refers broadly to striving toward standards of excellence that appears not to be prompted by a tangible reward (e.g. a monetary incentive) or intrinsic pleasure associated with the activity at hand (e.g. that associated with sexual behaviour) (see MOTIVATION). As an area of scientific study, it has roots in early research on aspiration levels (Lewin *et al.* 1944) and, especially, the need to achieve (Murray 1938, McClelland *et al.* 1953). Classic analyses posited that achievement motivation results from the interplay between the need to achieve and the need to avoid failure, assuming that these needs could be assessed via projective tests. A well-known research finding was that people high in the need to achieve and low in the fear of failure showed a preference for moderately difficult performance challenges. They did so, presumably, because these challenges provided a good opportunity to achieve and, at the same time, a limited chance to fail. In contrast, people low in the need to achieve and high in the fear of failure showed a preference for especially difficult challenges, presumably because failure could be excused. More modern analyses of achievement motivation assume that achievement behaviour is driven by multiple motives, with three receiving special attention: (1) that to appear capable, (2) that to avoid appearing incapable, and (3) that to achieve mastery within a performance realm. All of these motives involve an underlying concern with competence. In view of this, some investigators have recommended that the 'achievement' literature be reidentified as the 'competence' literature and that 'achievement motivation' be reidentified as 'competence motivation' (Elliot and Dweck 2005). An implication is that achievement behaviour should not be thought of as striving for no reward but rather as striving for a certain class of rewards.

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Elliot, A.J. and Dweck, C.S. (eds) (2005). *Handbook of competence and motivation*. New York: Guilford Press.

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action readiness The notion of action readiness designates the motivational aspect of emotions (see MOTIVATION). Most emotions contain readiness to change or

maintain a relationship with the world, oneself, or some object of thought. They involve a position taken towards that object (e.g. rejection), and readiness to implement that position in action (e.g. by moving away). This relational aspect pertains even to nonaction, as in depressed apathy: it implements loss of motivation to entertain any relationship whatever.

A motivational perspective on emotions seeks to account for feelings of urge, but also for the flexibility of emotional behaviour. Most emotional behaviour varies with available actions (e.g. running or jumping in fear) and with context (e.g. object location and nature). The variations all share the same relational end (e.g. diminishing exposure); they embody some aim. Different states of action readiness are defined by different relational aims. Exuberance, as in joy, defines diffuse openness to contacts; hostility, as in anger, defines stopping or hurting the antagonist; aimless excitement defines absence of relational direction.

States of action readiness possess a second defining property. They possess 'control precedence': they take control of action, attention, and thought when circumstances and efforts at restraint permit. They thus embody priority settings for dealing with what elicits them. Control precedence is inferred from persistence in the face of interruption and obstacles, single-mindedness, being distracted by emotions, their interrupting ongoing action, and neglect of incompatible information. These features led to the earlier designation of emotions as 'passions': states by which one is overcome and that carry one away.

States of action readiness are of two different kinds: activation and deactivation states (e.g. diffuse excitement), and *action tendencies.

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action tendencies The term 'action tendency' was coined by Arnold (1960) to account for several major aspects of emotional *feelings: felt urge, felt direction of that urge (e.g. towards or away from), and aboutness of that urge. Felt emotional tendency is about a thing or situation. The notion has been expanded to refer to the internal motive states that are hypothesized to underlie

action unit

such feelings, as well as overt behavioural phenomena with similar content.

Such inner states are conceived as those states of *action readiness that prepare and guide actions for achieving a particular relation with the object that the emotion is about (relations such as proximity, being remote from, or opposing). Action tendencies, both as felt and as transpiring from behaviour, are among the main features for assigning major emotion category labels to one's own emotions and those of other people or animals.

Action tendencies are distinguished by the kind of relational change at which they aim. The aims are inferred from self-reports, in which subjects may mention the content of their desire or urge ('I wanted to get away', 'I wanted to get back to him!'). They are also inferred from co-occurrence, in subject-event encounters, of behaviours that appear to share the function of modifying a relationship (e.g. self-protection, gaining proximity, rejection, expanding one's range of relationships), and that have led to inferring 'behaviour systems'. For example, intimidation, threat, attack, and insults all share in hurting an opponent and blocking offensive action; thinking of novel exploits, establishing new interpersonal contacts, and smiling at unknown people, all exemplify broadening-and-building.

Modes of action readiness and major emotion categories tend to correspond in unsurprising fashion. For instance, approach is often mentioned and observed in connection with desire, proximity-seeking with affection or love, moving away with fear, moving against with anger, rejecting with disgust (see APPROACH/WITHDRAWAL). A number of less obvious action tendencies are also meaningfully distinguished. For instance: dominance, or 'moving above', as the motive state that drives erect posture and vocal intensity in pride; 'moving below' or submission in humility, shame, and deference, as manifest in bent posture and downward glance; 'playful exuberance' that establishes brief and gratuitous contacts, as what drives joy; 'receptive openness', the unfocused attentional stance in many emotions of enjoyment; and inclination to fuse with some object, as in love and in mystical or 'oceanic' feelings.

States of action tendency can be felt without noticeable behavioural manifestations. One's 'heart swells up in pride'; one feels humbled by reading about Gandhi or Nelson Mandela; one strongly desires to be with someone one daydreams about. Action tendency, therefore, appears to exist regardless of motor action that implements it. As it should, of course, if it is the motive state that drives actions. States of action tendency thus appear to exist as fully central phenomena, without peripheral feedback. Two major sets of findings give support to that supposition. One comes from the analysis of mental

representations underlying word meanings, notably by Barsalou (1999). These appear to be largely modal, that is, representations of visual, motor, and tactual impressions. The other consists of the activity of so-called mirror neurons in ventral prefrontal and inferior parietal cortex (Rizzolatti *et al.* 1996). These neurons are activated when performing actions, but also when viewing those actions in other individuals, and when viewing objects that are usually the objects of such actions. Certain of those neurons respond not to the movements of given actions, but to setting their aim; they appear to embody action readiness as such.

Representation of aims forms a theoretical problem, because action tendencies are not premeditated; they are not preceded by deliberate goal setting (see GOALS). However, actions that are both impulsive or emotional *and* purposive are common; eye fixation is an example. The purposiveness can be understood by the so-called efferent copy theory. Aims can be understood as setting 'efferent copies', that is, setting inner representations to which the outcomes of successful actions will match.

Outcome expectancies are produced by appraisal (see APPRAISAL THEORIES) of the event that elicits the emotion; they thus result from appraisal processes.

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action unit Action units (AUs) refer to the functionally independent muscles identified and coded in the *facial action coding system (FACS) (Ekman and Friesen 1978). Each AU refers to the most elemental, independent movement of the facial mimetic musculature (see FACIAL EXPRESSION (OF EMOTION)). Most single muscles can move in only one way, producing one change of appearance on the face; each of these is identified by its own FACS AU code. Several muscles, however, can move in more than one way, producing multiple changes in appearance. The frontalis muscle across the forehead, for example, can move in the middle, raising the inner corners of the eyebrows, and on the outside, raising the outer corners of the eyebrows. Both of these actions are identified as distinct AUs in FACS, even though they refer to movements of the same single muscle. Orbicularis oris, the muscle in the lips, can be tightened and tensed, producing one change in appearance, or pressed together, producing a different change in appearance. These actions are also identified as distinct AUs in FACS, even though they refer to movements of the same muscle. In contrast, the *corrugator muscle group, which lowers the brows and brings them together, comprises three muscles, and one when is innervated they are all innervated, lowering the brows down and together and producing a single type of change in appearance. This action is identified as a single AU in FACS, even though it refers to movements of

multiple muscles. For these reasons, AUs are based in functional, not structural, anatomy.

Any facial behaviour can be described in terms of the AUs that singly or in combination produce it. A smile of enjoyment, for instance, known as a Duchenne smile, involves AU 6 (orbicularis oculi) and AU 12 (*zygomatic major). Non-Duchenne smiles typically involve only AU 12. Expressions of sadness typically involve the raising of the inner corners of the eyebrows (AU 1), sometimes with corrugator (AU 4), and often with lowering of the corners of the lips (AU 15) and pushing up of the lower lip (AU 17). The eyebrow flash, which is used as a greeting in many cultures, involves the raising of both the inner and outer corners of the eyebrows (AUs 1 and 2).

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adaptation Adaptation refers to any action process or mechanism that reduces the effects of a constant or repeated stimulus. Adaptive processes range from behaviours that reduce exposure to that stimulus to molecular changes at the cellular level. For example, when we step from a dark building into sunshine, we adapt to the sun's brightness by turning away, by squinting, by the contraction of our pupils, and by photochemical changes occurring within our retinas.

Helson (1948, 1964) introduced the notion of an 'adaptation level'—the level of a stimulus that elicits no response or which is affectively neutral. He proposed that an individual's reaction to a stimulus is a function of the difference between the current stimulus level and the current 'adaptation level'. Helson's model captures the observations that the affective intensity of a stimulus depends on past levels of stimuli and diminishes over time for a constant stimulus. Thus, entering a room at 20°C feels more pleasurable when the temperature outside is really cold, but ceases to confer pleasure after we have been inside for a while.

Adaptive processes both reduce the harmful impacts of a stimulus (e.g. sweating is an adaptation to heat) and preserve perceptual sensitivity to small changes in the stimulus level. For example, when we first walk indoors from the afternoon sun everything looks dark, but after continued exposure we not only can see again but have regained sensitivity to small differences in luminance levels, permitting us to detect when a single light bulb burns out in a large auditorium (Frederick and Loewenstein 1999).

The power of adaptive processes is supported by studies showing that happiness is barely correlated with objective circumstances (see LIFE SATISFACTION). For example, lottery winners and recently paralysed people express levels of happiness that are comparable with those of people who have experienced neither

(Brickman *et al.* 1978). Similarly, as nations get wealthier, the reported well-being of its citizens does not increase (Easterlin 1995).

Such data have given rise to the concept of a 'hedonic treadmill' (Brickman and Campbell 1971), which suggests that happiness remains stationary despite efforts or interventions to advance it. The suitability of this metaphor remains in question, however. The research cited to support it relies on subjective self-reports whose interpretation is unclear. When asked 'How happy are you on a scale from 0 to 100?', respondents must judge for themselves what the endpoints of the scale represent. Someone who has lived a tough life might interpret '0' as unrelenting torture and '100' as pleasant comfort, whereas someone who has lived an easy life might interpret '0' as the absence of joy and '100' as heavenly bliss. If both people declared their happiness level to be a '60' (out of 100), it would obviously be wrong to conclude that they really are equally happy, since one has adopted a higher standard for the internal feeling that warrants that rating (Frederick and Loewenstein 1999, Kahneman 2000).

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addiction The exact definition and aetiology of addiction is disputed among health professionals and addiction researchers. The World Health Organization defines the term 'addiction' as: 'Repeated use of a psychoactive substance or substances, to the extent that the user (referred to as an addict) is periodically or chronically intoxicated, shows a compulsion to take the preferred substance (or substances), has great difficulty in voluntarily ceasing or modifying substance use, and exhibits determination to obtain psychoactive substances by almost any means. Typically, tolerance is prominent and a withdrawal syndrome frequently occurs when substance use is interrupted.'

The Diagnostic and Statistical Manual for Psychiatric Disorders, Fourth Edition (Text Revision) distinguishes between substance dependence and substance abuse. 'Substance dependence' is marked by symptoms of physiological tolerance, withdrawal, persistent desire and unsuccessful efforts to stop substance use, interruptions to work and social activities because of substance use, a large amount of time spent securing and using the substance or recovering from its effects, and continued substance use despite negative physical and psychological consequences of use. 'Substance abuse' is defined as recurrent failure to fulfil work, school, or home obligations because of substance use, substance use in physically hazardous situations, substance use resulting in legal problems, and continued use despite negative social and relationship consequences related to use. For many people, addiction results in compulsive craving,

admiration/awe

drug seeking, and drug use, which persists even in the face of severe adverse consequences.

Several models of addiction have been put forward, each attempting to explain and predict addictive behaviour. Benjamin Rush (1745–1813) was among the first to introduce the disease model of addiction, which defined addiction as a result of human weakness representing a defect of moral character. Individuals who endorse the moral model do not believe there is any biological or genetic basis for addiction and thus have little sympathy for people with severe addictions (Harding 1986; Peele 1987). The disease model, which is held by the American Medical Association and many addiction specialists around the world, views addiction as an illness that results from the impairment of neurochemical and/or biobehavioural processes (Jellinek 1960, Room 1983). Behavioural models, including classical and operant conditioning models, are based on the premise that addiction is a consequence of learning, such that problematic habits and maladaptive behaviour patterns are initiated and maintained by past and present *rewards (reinforcement), environmental access, family history, peer influences, and individual beliefs and expectations. The disease and behavioural models of addiction agree that a large component of addiction can be explained by neurochemistry and neuroadaptation following repeated exposure to drugs and/or alcohol (Robinson and Berridge 1993). All known drugs of abuse have the common effect of elevating the level of dopamine in the nucleus accumbens. Dopamine is a neurotransmitter that is part of the reward system, and continued use of drugs and alcohol will eventually result in the reward system reducing the amount of endogenous dopamine by causing a decrease in the number of dopamine receptors (Kalivas and Volkow 2005). Craving and withdrawal, two indicators of addiction, are directly related to reduction in dopamine receptors in the brain (Lowman *et al.* 2000).

Regardless of how addiction is defined or the aetiology of addiction explained, the fact that addictive behaviour often results in large costs to the individual and society is indisputable. For individuals the costs can be financial (medical and legal costs), physical (health and disease), and emotional (including the toll of addiction on family and friends). For society, costs are often attributed to medical and social welfare costs, the cost of drug-related law enforcement activity, and lost productivity due to drug use. For example, in the United States it is estimated that the annual costs of drug abuse and dependence (including costs to society and treatment costs) amount to more than \$500 billion. Unfortunately only a small percentage of this amount is spent on treatment, even though with every dollar spent on addiction treatment there is a \$4–7 reduction in the

cost due to drug-related crimes (National Institute of Drug Abuse 2006).

To understand the treatment of addiction it is important to recognize addiction as a chronic, persistent condition that is complex but treatable (McLellan *et al.* 2000). Within many treatment settings the ultimate goal of addiction treatment is to enable an individual to achieve abstinence from drugs and/or alcohol. More immediate goals of treatment are to reduce the addictive behaviour, improve functioning, and minimize the physical and social consequences of addiction (harm reduction). Individuals who receive treatment for an addiction may experience relapses even after long periods of abstinence (Moos and Moos 2006). In fact, relapse to drug abuse occurs at rates similar to that for other chronic medical illnesses such as diabetes, hypertension, and asthma. As such, addiction may require repeated treatments tailored to individual needs and relapse risk factors (Witkiewitz and Marlatt 2004).

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admiration/awe Admiration and awe are on few lists of *basic emotions, yet there can be little doubt that people sometimes feel a strong emotional response to extraordinarily talented, powerful, or famous people. An essay on Noam Chomsky (1928–) described the ‘nearly theological reverence’ that his students had for him: “It verged on worship”, Robin Lakoff, a member of this group, later wrote. “To be in Chomsky’s good graces meant that you were worthy of him, you partook in some small way in the godhead” (L. MacFarquhar in *The New Yorker*, 31 March 2003).

In their cognitive theory of emotions, Ortony *et al.* (1988) grouped admiration and awe together with esteem and respect and called them ‘appreciation emotions’—triggered by positive appraisals (see APPRAISAL THEORIES) of the actions of an agent. Many social animals have emotions related to fear and submission, but none seem to have positive emotional responses to excellence. Why would humans have evolved such feelings? There is almost no empirical research on admiration or awe, so we are forced to confine ourselves to theoretical speculations.

Admiration

The word admiration comes from the Latin *admirare*, to wonder at, and the Oxford English Dictionary (OED) defines it as ‘agreeable surprise; wonder mingled with reverence, esteem, approbation’. Perhaps the best way to understand the origins and functions of admiration is to view it as an emotion that facilitates learning (Henrich and Gil-White 2001). As humans were becoming cultural creatures who did most of their learning by copying others, it became adaptive to find the best role models to copy. Individuals who excel in any culturally valued skill therefore draw attention and followers. The