



Flexibility

The Science of Resilience

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Definition

Flexibility is defined as “an adaptive personality quality that enables individuals to meet the specific constraints of a variety of situations” (Cheng, 2001, p. 814). Flexibility in thinking and adapting to changes is one of the traits of resilience. Individuals with flexible knowledge can apply multiple strategies based on the situation.

Flexibility is one of the higher-level cognitive process that help a person to break out of habits and adjust their behaviour, make decisions, evaluate risk and strategies, prioritize, and cope with difficulties. Executive function “consist of several processes: (1) anticipation and deployment of attention, (2) impulsive control and self-regulation, (3) initiation of action, (4) working memory (WM), (5) mental flexibility and utilization of feedback, (6) planning ability and organization, (7) selection of efficient problem-solving strategies, and (8) monitoring of performance” (Coulacoglou & Saklofske, 2017, p. 91). This function is important in daily activities and affects a person’s quality of life and functional outcomes (Coulacoglou & Saklofske, 2017).

Flexibility is one of the most common disposition in critical thinking (Facione et al., 1994). A critical thinker possesses the willingness to see diverse perspectives and think creatively, which requires open-mindedness and flexibility. These behaviours are important in making inferences, judgements, decisions or solving problems (Lai, 2011).

Flexibility is also an important factor in decision-making process. Merkhofer (1975) found that decision flexibility is important to be incorporated in decision analysis framework. Cognitive flexibility is an outcome of cumulative processes: situation evaluation, behaviour, and task performance. When making decisions, decision-makers face and analyse the situation and its uncertainty. The assessment is turned into a perception of utility and attention to behave in a certain way. This behaviour emerges as a certain performance. Therefore, flexibility is needed in every behavioural adjustment in decision-making situations. Failing to adapt cognitive and behavioural patterns to fit with the current situation cause errors and ineffectiveness in decision-making processes (Laureiro-Martínez & Zollo, 2009).

The ability to choose efficient strategies and utilise multiple strategies is the main outcome in problem-solving domain (Star & Rittle-Johnson, 2007). Individuals who utilise more strategies and attempt to use different strategies to solve a problem have better successes in many cognitive tasks, especially those that involve estimation (Dowker, 1992). Flexibility in problem solving is “knowledge of (a) multiple strategies and (b) the relative efficiency of these strategies” (Star & Rittle-Johnson, 2007, p. 566). A flexible person knows multiple strategies to complete their tasks and knows which strategies are more efficient in solving a problem. Inflexibility is linked to low achievement and difficulty in problem-solving (Star & Rittle-Johnson, 2007).

Individuals with positive affect have better cognitive flexibility, adaptive thinking, innovation, and are better at solving problems. Individuals with positive affect tend to be more open to different strategies and information and less controlling; therefore, they are more adaptive and responsive in solving problems. They tend to be more careful in processing strategies and will consider multiple strategies that are compatible with the current situation. Meanwhile, individuals with less positive affect tend to control, distort, or ignore information that do not fit with their view (Isen, 2002).

Relationship to Resilience

Cognitive Flexibility

Cognitive flexibility, or the ability to shift one's thought or action to another according to the situations or demands, is crucial in building resilience (Genet & Siemer, 2011). Martin & Rubin (1995) describe cognitive flexibility as "a person's (a) awareness that in any given situation there are options and alternatives available, (b) willingness to be flexible and adapt to the situation, and (c) self-efficacy in being flexible" (p. 623). Cognitively flexible individuals are aware that they have options, are capable of switching their responses, and are confident in doing so (Martin & Rubin, 1995). They acknowledge multiple representations, view cases and concepts as multidirectional and interconnected, and utilise the ability to assemble the knowledge based on the needs of a particular situation (Spiro et al., 1988).

Two central components in cognitive flexibility are *inhibition*, or the ability to suppress dominant responses and to limit oneself from processing irrelevant materials; and *shifting*, or the ability to switch focus back and forth between concepts by working on relevant materials and disengaging from irrelevant material (Genet & Siemer, 2011). Individuals with effective cognitive flexibility are capable of switching their emotions, and therefore have better emotion regulation (Ochsner & Gross, 2007). Various factors influence flexible cognitive processing, including positive mood, behavioural variability, and cognitive activities. Positive mood improves flexible processing in categories utilisation, relationship recognition, and development of creative solutions. An effective emotional regulation is linked to higher resilience (Genet & Siemer, 2011).

However, failure to control or change unpleasant thoughts or emotions (experiential avoidance) are associated with poor psychological functioning, psychological distress, stress symptoms, somatisation, and problematic health behaviour. Experiential avoidance uses "psychological sufferings as primarily a function of attempts to avoid unwanted private experiences" (Francis et al., 2016, p. 134). Individuals who ruminate (repetitively going over a thought or a problem without completion) are inflexible and have difficulties in switching task sets (Whitmer & Banich, 2007).

Individuals who are inflexible (incapable to use the right coping mechanism when responding to a stressor) are prone to psychopathologies (e.g. depression and anxiety disorders). A loss of flexibility aggregates a person's continuous low mood and their inability to get pleasure from their environment, which are the major symptoms in depression. Inflexibility in responding to fear and anxiety are found in individuals with anxiety disorders (Kashdan & Rottenberg, 2010).

More recently, clinical psychology has explored the link between flexibility and health and well-being as a desired treatment outcome of therapies. Psychological flexibility is derived from the Acceptance and Commitment Therapy (ACT) theory and emphasizing a trait in which a person can maintain their consciousness and connectedness to the present moment (Francis et al., 2016). Hayes et al., (2006) defines psychological flexibility as the ability "to contact the present moment more fully as a conscious human being, and to change or persist in behaviour when doing so" (p. 7). It includes a person's ability to recognise and adapt to situational demands, change their mindsets or behaviour when they do not fit in the current situation, maintain life balance, and to be aware and open to behaviours that are aligned with one's values (Kashdan & Rottenberg, 2010). Psychological flexibility consists of three interrelated components: *openness* (a willingness to have unpleasant internal experiences), *awareness* (consciously paying attention when engaging a behaviour), and *engagement* (identifying and engaging in meaningful and important actions (Hayes et al., 2011; Kroska et al., 2020). Psychological flexibility has been found to improve an individual's quality of life and decrease their psychological distress (Francis et al., 2016).

Psychological flexibility is influenced by three factors: executive functioning, default mental states and personality configurations (Kashdan & Rottenberg, 2010). Executive functioning allows a person to shift focus and change their cognitive sets when shifting their focus. "This is a critical element of self-control and goal-directed behaviour" (Kashdan & Rottenberg, 2010, p. 871). Self-control is important in maintaining flexibility. Self-control can be improved or reduced. Self-regulation, as part of self-control, is a base for flexibility (Kashdan & Rottenberg, 2010). Psychological flexibility requires good performances in various cognitive functions: attentional control; the ability to tolerate stress, be receptive to emotions, thoughts, and sensation; and to accept and aware of the process when dealing with negative experiences. Attentional control is crucial because behavioural set needs to fit in the context, while being able to receive negative emotions positively is important as a part of learning and developing meaningful goals and values. It is crucial to maintain a default balance between putting efforts into the current situation and saving mental energy for future situations. One way to maintain the balance is through stereotyping and habits. Heuristics help individuals in navigating multiple social interactions. However, impressions and stereotyping are resistant to changes. Personality traits influence a person's psychological flexibility. Four personality dimensions which are relevant in psychological flexibility are neuroticism, positive affect, self-control, and openness to experience. People with neuroticism tend to have rigid responses and are less flexible. Positive emotions/affects improve memory, creativity, and openness to new perspectives. To

be flexible, people need to be open, curious, and receptive to new knowledge and experience. A person with openness to experience are also more tolerant and have more compassion.

Coping Flexibility

Resilient individuals are able to flexibly evaluate the meaning of stressful situation and use different types of coping responses as needed and as fit to the situation (Fresco et al., 2006; Bonanno et al., 2011). Coping flexibility is defined as a person's ability to formulate flexible coping strategies in regard to a particular situation and demand under changing circumstances (Cheng, 2009). The ability to flexibly evaluate the meaning of stressful situations, or explanatory flexibility, improves a person's ability to find adaptive solutions to cope with them. Fresco et al., (2006) define explanatory flexibility as "the degree to which individuals balance their interpretation of events with historical and current contextual factors and make effective use of that information" as explanatory flexibility (Fresco et al., 2006, p. 202).

Explanatory flexibility and coping flexibility directly affect negative emotions through different pathways. Explanatory flexibility affects individuals' meaning making of the event which directly correlates to depression and anxiety. On the other hand, coping flexibility affects strategies that are used, which, depends on the effectiveness and one's perceived self-efficacy, may impact individual's symptoms of depression and anxiety (Fresco et al., 2006). Individuals with better coping flexibility tend to have lower anxiety, depression, psychosomatic and stress-related symptoms (Fresco et al., 2006; Cheng, 2009; Kato, 2015). Cheng et al., (2007) found that people with higher coping flexibility have lower anxiety and better quality of life in long term.

Coping flexibility consists of three components: flexible cognitive appraisal, flexible coping pattern, and a good strategy-situation fit (Cheng, 2001). Individuals with high coping flexibility are capable in identifying their ability to control a difficult situation and in utilising different strategies accordingly (Cheng, 2009). The efficacy of coping and emotion regulation strategies are varied. The efficacy is influenced by context, time, and choices. A coping process may be effective in one context but not in another and adjustment based on the nature, duration, context, and controllability is needed (Bonanno & Burton, 2013).

Cheng (2001) lists five types of coping flexibility:

- a *functional flexible* or *active flexible* or *versatile* is found in individuals with the ability to identify and give an appropriate response to a changing situational demand. These individuals mainly use primary approach coping (or problem-focused coping, i.e. strategies to change aspects of the stressful event) in a controllable situation. When the situation is uncontrollable, they utilise various strategies to change their thoughts or feelings (secondary approach coping or emotion-focused coping).
- an *active-inflexible* or *rigid-instrumental* or *cognitively active* is found in individuals who perceive most situations as controllable, and therefore mostly use primary approach coping to face difficult situations.

- a *passive-inflexible* or *resigned-defensive* or *passive impulsive* is found in individuals who perceive most situations as uncontrollable, and therefore mostly use secondary approach coping to face difficult situations.
- *active-inconsistent* individuals recognize that some events are controllable, and some are uncontrollable. However, they prefer to use problem-focused coping strategies to cope with both events.
- *passive-inconsistent* individuals perceive their situation as consistent but use inconsistent coping pattern.

Individual's coping flexibility is influenced by their decision-making styles (Cheng, 2009), strategy-situation fit, and goals attainment (Cheng, 2001). Different heuristics in decision-making process affect individuals' coping flexibility pattern (Cheng, 2009). Individuals who utilise the right strategies at the right situation (strategy-situation fit) are more adaptive compare to the ones that use a particular strategy regardless of the situation or the ones that use random coping strategies across different situations. Individuals that aimed their behaviours toward their own goals and the fulfilment have better psychological well-being (Cheng, 2001).

Bonnano & Burton (2013) argue that flexibility, as a response to the shifting of demands, is ongoing and composed of multiple components, including:

- *Context sensitivity*, or the ability to perceive demands and opportunities based on situational context and to determine the appropriate strategy response to those demands or opportunities. People identify cues from their social environments and cues that provoke emotions and use them to regulate an appropriate strategy accordingly.
- *Repertoire*, or a person's ability to utilise various strategies to accommodate a wide range of demands and opportunities. Repertoire can be assessed using three approaches: the total number of different strategies people owned, temporal variability (repeated use of a strategy is associated with adjustment and changes in the strategy over time), and categorical variability (how broad and diverse a person's regulatory strategies are).
- *Feedback monitoring*, or the ability to use the feedback from previous strategies to improve the efficacy of said strategies. Feedback monitoring is predominantly an internal course, but external feedback from social environment about the effectiveness of a strategy is also crucial

Cognitive and Coping Flexibility

Traumatic experiences defy meaning and one's view about the self, the world, and other people. In adversities, coping flexibility facilitates adjustment by the utilisation of various coping strategies and minimizing the trauma focus through distraction or focusing to the future (Bonanno et al., 2011). Cognitive and coping flexibility engender resilience through positive adaptation, a sense of control, self-efficacy and lower symptoms of stress and depression (Park

et al., 2015; Galatzer-Levy et al., 2012; Burton et al., 2012; Lam & McBride-Chang, 2007; Wei et al., 2009).

Coping flexibility moderates psychological distress after a traumatic event. The ability to flexibly use coping strategies is important in preventing pathological reactions despite cultural differences (Burton, et al., 2012). Flexibility in evaluating previous effective strategies (feedback) and the willingness to adapt alternative strategies are associated with more adaptive outcome in a stressful event. The use of multiple coping strategies is needed in order to reduce psychological distress (Kato, 2015). Two strategies—through emotions and thoughts, and through focusing on the present and future goals—are simultaneously needed to minimize psychological distress as the outcome after a traumatic event (Park et al., 2015).

Park et al. (2015) found that individuals with higher cognitive flexibility report lower depressive symptoms after traumatic experiences. By focusing on present and future goals but at the same time not avoiding the traumatic experience itself, individuals are able to cope with their traumatic experience better and thus prevent PTSD and depression.

Galatzer-Levy et al., (2012) found that coping flexibility engenders positive adaptation from a potentially traumatic experience and common stressors among college students. The ability to focus one's attention on distressing subject and shift the focus away from the same subject facilitates individual's adaptation. High distress and less resilient individuals tend to use trauma-focus coping, which focuses on the present, while the stable and resilient individuals use more flexible coping and are able to switch to forward-focus coping when needed. Trauma-focus coping is related to prolong grief and depression (Burton et al., 2012).

Coping flexibility also improves one's sense of control, self-efficacy and lower symptoms of stress and depression. The ability to employ various coping strategies engender one's sense of control and self-efficacy in adversities. Being flexible also provides individuals with a positive affect which, in turn, improves their self-efficacy and compassion and lowers their level of stress. For example, college students who use flexible coping strategies in a major life event have lower psychological distress. Cognitive flexibility also helps bicultural students navigate in two different cultural norms, thereby reducing their bicultural stress. In contrast, individuals with learned helplessness and depressive symptoms give up easily when facing difficulties (Lam & McBride-Chang., 2007; Wei et al., 2009).

Genet and Siemer (2011) found that cognitive flexibility and flexible affective processing (switching back and forth from processing affective and non-affective stimuli), independently affect individual's resilience. Flexibility in affective switching when working on a difficult task is associated with trait resilience. Trait resilience is tied to a specific process related to flexibility. They argue that activation of a new task is a less crucial trait resilience compare to inhibition of irrelevant task. In a global pandemic which causes general and peritraumatic distress, individuals' emotional and behavioural awareness and their ability to intentionally decide their

own actions foster a sense of well-being. Doing actions which align with one's values provide a sense of awareness and gives meanings to the situation (Kroska et al., 2020).

Coping flexibility is also related with optimism. Optimistic individuals are more flexible in changing coping strategies based on the demands and are more flexible in adjusting their goal. In adversities, being optimistic and flexible lowers perceived life stress and improves individual's life satisfaction and psychological well-being. In turn, flexible individuals with lower life stress and better life satisfaction are also more optimistic (Reed, 2016; Hanssen et al., 2015).

Individuals from lower socioeconomic status tend to be more flexible and utilise more varied coping strategies based on the controllability of the situation. Individual with higher socioeconomic status have better resources and personal control, and therefore have the privilege to use primary approach strategies to face stressful situations. Individuals with minimal resources are required to accept the situation and adjust their strategies based on the condition. Their limited resources prevent them from using primary approach strategies all the time, because, by using primary approach strategies, they will reduce their already restricted resources. Coping flexibility improves their quality of life through positive reappraisal, fostering a sense of purpose and control in life (Atal & Cheng, 2016). These findings align with a study by Metzl (2009). Metzl (2009) found that flexibility varies across culture and is more prominent when other privileges and resources are not available. People with originality and flexibility had lower clinical stress and higher life satisfaction after hurricane Katrina. Flexibility supports the resilience process while originality improves problem-solving and motivational elements following hurricane Katrina. Flexibility and creativity are used as a way to process the event, such as through arts, and are used in the reconstruction process. Being flexible also helps individuals cope with situations that could not be dealt with a single strategy and restricted resources. Metzl (2009) found that these traits are more common among African American and people with greater income disparity.

Dialectical thinking increases flexibility in coping which, in the long term, reduces an individual's anxiety. Dialectical thinking is comprised of three perspectives: change (seeing the world as always changing); contradiction (contradicting propositions can coexist in harmony); and meaning (the meaning of an event is varied and is framed by the context in which it is embedded). Individuals with high coping flexibility have higher tolerance of uncertainty and ambiguity, and therefore have a lower need for closure. They have a more balanced coping strategies and better at identifying the right strategies for each situation (Cheng, 2009).

Improving

Hall et al., (2003) proposed several skills that promote flexible thinking. The skills are used to regulate emotions and analyse the situation more flexibly, therefore enhancing resilient behaviour. The skills include:

- recognizing that our beliefs about adversity affect how we feel, and consequently what we do (the ABC model)
- challenging our beliefs about why things happen - uncovering our thinking style
- developing an awareness of common thinking traps or errors
- understanding that our core beliefs about the world may be preventing us from taking opportunities
- gathering evidence to dispute/support beliefs - generating other alternatives
- putting stresses/adversities into perspective
- calming and focusing (Hall et al., 2003, p. 3)

Physical activity, such as aerobic exercise, also enhances cognitive flexibility. Aerobic exercise positively affects neurocognition, especially in the executive function or cognitive flexibility. Aerobic exercise affects prefrontal cortex of the brain by improving cerebral blood flow and oxygen delivery, eliciting of fibroblast growth, decreasing brain tissue loss and increasing neurotrophin factor (Masley et al., 2009). Other activities that enhance emotional well-being, and therefore improves creativity and divergent thinking abilities, are listening to music and dancing. Listening to music and dancing can elicit positive emotion, which in turn improve one's divergent and more flexible thinking in categorising and organising ideas (Campion & Levita, 2013).

Interventions

The ABC Intervention

The ABC intervention improves young children's cognitive flexibility and theory of mind skills through two components: nurturing and synchronous care. The two components are targeted in numbers of way, such as: explaining the importance of nurturing and synchronous care to the caregiver; providing video-recorded samples to show parent-children interaction and how to "follow the child's lead" during a structured activity; giving feedback to the caregiver; and analysing care giver's early experience that may hinder the nurturing and synchronous care to the children. Lewis-Morrarty et al., (2012) found that the 10-session intervention program works in enhancing young children's self-regulatory capacity.

Cognitive flexibility intervention

Cognitive flexibility, as one of the key parts of executive function, can be improved by cognitive training, such as using an online game platform. Buitenweg et al. (2017) created an intervention study by incorporating frequent sessions and flexible adaptive training tasks. The target of this intervention is healthy older adults (60-80 years old). The intervention is conducted as 58 half-hour sessions over 12 weeks. The intervention improves flexibility by integrating task switching training between games. The game was found to improve planning, reasoning, cognitive flexibility and working memory.

Coping flexibility interventions

Coping with chronic illness

Schwartz and Rogers (1994) propose a psychological intervention to teach coping flexibility for chronic illnesses. The intervention consists of eight weekly two-hour educational and supportive sessions. The intervention improves participants' coping flexibility by helping them to recognize when their coping strategies are not effective, differentiate between controllable and uncontrollable situation, and recognising other perspectives and strategies available for the situation. This is done by developing participants' self-awareness of their strength and limitations. See Appendix A for an agenda of the intervention.

All eight sessions started with a brief relaxation exercise and closed with a discussion about coping flexibility. Each session targeted different aspects of coping flexibility (Schwartz & Rogers, 1994):

- The goal of Session One and Two is to introduce the agenda of the intervention and facilitate a discussion to address negative feelings from previous experiences. Establishing awareness of the way other people cope fosters commonality in the group and works as the foundation for the intervention. Establishing awareness of also help the participants to acknowledge their strength and limitation.
- In Session three, participants are encouraged to engage in a deeper level of awareness about their illness using a drawing activity. Illustrating their illness and sharing the impressions with group members shows how one negative reference might be seen differently by other people. A crucial element of coping flexibility in this session is to guide participants' awareness that illness can be seen through different perspectives. The home assignment after this session is to write six goals for themselves in order to see their goal-setting methods.
- In Session four, the participants are coached about goal-setting and how to implement it flexibly in their life. The participants are encouraged to set goals that are attainable, measurable, specific, not related to their health, can be achieved independently, and aimed towards improving what is already present rather than dealing with something that is absent. They are also asked to use flexibility in setting their goals. The assignment for this session is to rework the initial list from Session three.
- In Session five, the participants are trained to design customized strategies to compensate for their weakness using their cognitive strength. Participants are provided with five guidelines: *developing good life study habits* (to help with organisational loss by using organiser notebook to keep track of their life); *patterning* (setting up structure and routine); *prevention* (recognizing the situations that worsened their problem and attempt to face it before it gets worse); *practicing calm*; and *adapting one's environment*.

- Season six is done in three rounds: first, support people talk about aspects of themselves and their feeling (25 minutes); second, participants talk about what they have learned about themselves from the support people (25 minutes); third, participants and their support people are gathered to share their impression about the previous rounds (25 minutes). This session aims to help participants to see their self from the perspective of others and improve communication between them and their support persons.
- Session seven involves the Request/Decline exercise which is done in pairs by unrelated people. This exercise aims to bring awareness of rigidity in role pattern.
- Session eight gives participants the opportunity to discuss any changes after the training.

The first three sessions aim to improve one's awareness about their feeling and perspectives and to improve their knowledge about coping flexibility. This is done by teaching people to acknowledge difficulties, which results in enhanced awareness. A person cannot observe a "sense of control" but they can be taught to recognize and construct actions for situations that they can control. The group cohesion (developed in session 1-3) facilitates coping flexibility by showing that each person has something different to offer to the group. Sharing and helping others in the group also fosters a sense of self-efficacy and encourage awareness of other viable choices and options in a given situation. The last five sessions focus on improving goal-setting skills, cognitive flexibility, and communication skills. The goal-setting training aims to improve participants' awareness of their cognitive strength and weakness and set their goals based on their situations. The support sessions shows their relational tendencies and constraints and improves their communication skills. The purpose of this is to reinforce their ability to get a predictable response and positive outcomes from their environment to successfully meet their goals.

Coping with health- and work-related stress

Cheng et al., (2007) and Cheng et al., (2012) built and examine another coping flexibility intervention aiming to manage health-related and work-related stress. The intervention is done using various cognitive and behavioural strategies. Participants are trained to be more sensitive toward the demands and distinguish various coping strategies to fit the situation. The intervention is divided into two parts: four sessions of cognitive-behavioural intervention and two sessions of coping flexibility model intervention. Participants are asked to discuss various cause of stress (from work or health-issues). The cognitive and behavioural technique and the coping flexibility training aim to improve participants' awareness of different strategies, controllability of the situation, and awareness of when to use primary or secondary coping strategies. All of these are central in coping flexibility.

- The first session provides an overview of the cause of stress and explores the participants' source of stress.

- The second to fourth sessions involve training the participants about cognitive and behavioural techniques to cope with the situation.
- The fifth and sixth sessions involve training the participants to distinguish between primary coping strategies (changing the problems or the environment) and secondary coping (changing one's emotions and thoughts); and to distinguish between controllable events and uncontrollable events. Participants are taught that identifying the controllability of an event is crucial in determining the effectiveness of a strategy.

After taking the intervention program, the participants showed greater flexibility in handling stressful events, which remained stable at least four months after the intervention.

Pretend play

Divergent thinking affects children's imaginative play and how they cope with problems. Pretend play is related to adaptive functioning, emotion regulatory skill, and children's cognitive skills, which are important skills across development (Doernberg et al., 2020). The complex structure of pretend play facilitates children's ability to generate greater number of strategies to face stressful situation. It also improves their active coping, identification of emotions, and gives them ways to experiment with solutions (Fiorelli et al., 2012).

Moore and Russ (2008) analysed the effect of a pretend play intervention. Participants (children from 6 to 8 years old) were given standardized instructions, props, and scripts designed to trigger imagination and organization in play. Another group of participants were given standardized instructions, props, and scripts designed to trigger affect expressions. The goal of this intervention is to see changes in divergent thinking, story organization, object transformation, and changes in affective play processes.

The intervention was done in five, 30-minute individual sessions for 3 to 5 weeks. Each child played out four stories per session and was instructed to make up 1 story in each session. Children in the affect group were given a set of toys (Legos, blocks, human-like dolls, cars, plastic animals). They were asked to express their feeling using the play scripts. They were also asked to play out stories with high fantasy content and story organisation. To encourage affective trial, the examiners used modelling, reinforcement, and reflection of feeling. Moore & Russ (2008) found after the intervention, children's play processes improved, they had better imagination and affect expression.

Doernberg et al. (2020) also analysed a pretend play intervention for school-aged children (6 to 9 years old) diagnosed with high-functioning ASD. The intervention focused on imagination in story-telling, emotions expressed in play, and story organization. The interventionist used modelling, scaffolding, praising, reflecting emotions, and followed the child's lead as prompts. The play length was 15-20 minutes, using toys such as blocks, Legos, dolls and cars. The interventionist started each session with following script to describe the expectations:

I have some toys for you to play with. I want you to make up stories about different things. So, you can make up a story and play it out with the toys. I will tell you when we are going to switch stories! Have the dolls and animals talk out loud so that I can hear. I will play with you. I want you to make up a story with a beginning, middle, and end. Think about what will happen next in the story. Use your imagination and make up new things. (Doernberg et al., 2020, p. 581)

Different story scripts were used, with three to four stories completed in each session and one story made up by the child. Some examples of the themes are: “let’s make up a story about a boy who goes to the zoo!” or “let’s make up story about a birthday party!” or “let’s make up story about losing a favorite toy” (Doernberg et al., 2020, p. 581). In each session, the interventionist used prompts, models, and praise to facilitate the play.

- To trigger imagination and fantasy:
 - Prompts, such as “what is happening?”, “What will happen next?”, and “Make up a different ending” are used to guide the play.
 - Modelling to show the children how objects can be used in different ways and how fantasy can be integrated in the story.
- To facilitate organized play, the interventionist used modelled sequencing (beginning, middle and end).
- To facilitate affect expression:
 - the interventionist used affect prompts, such as “How is he/she feeling?”, “How did that make him/her feel?”
 - modeling, using exaggerated tone of voice, facial expression and movement is used.
- Positive reinforcement was implemented throughout the sessions.

Doernberg et al. (2020) found that after 5 weeks of intervention, the children showed a significant increase in their cognitive skills in play. They exhibited improvements in their imagination, which shows that the play intervention improves children’s ability to think creatively and flexibly. They also had better organization score and better understanding in the use of cause-and-effect. It is likely that many factors of the intervention improved children’s cognitive play skills, including: specifically labelled praise for flexibility, modelling and scaffolding, story similarity to day-to-day, and complex fantasy-based stories.

Acceptance and Commitment Therapy (ACT)

The Acceptance and Commitment Therapy (ACT) is an intervention working on behavioural awareness and openness to experience. ACT is rooted in functional contextualism, which views psychological events as an ongoing interaction within historical and situational contexts (Hayes et al., 2006). From an ACT perspective, people’s behaviour is mainly stirred by their inflexible verbal network, and therefore people are less likely to act in a way that is consistent with the environment standard that would foster one’s values and goals. This

inflexible verbal network supports experiential avoidance. Avoiding uncomfortable events and being afraid to evoke these events narrow people range of behaviours. In order to increase psychological flexibility, ACT targets six core problems: acceptance (as an alternative to experiential avoidance); cognitive diffusion (altering undesirable functions of thoughts by creating contexts to diminish the unhelpful functions); being present; self as context; values; and committed action (Hayes et al., 2006).

Lappalainen et al., (2014) analysed the effectiveness of internet-based ACT (iACT) vs face-to-face ACT. Both programs ran for six weeks in which the participants received ACT-based treatment once a week. In the face-to-face treatment, each session was 60-minutes. The therapists worked to find out the most effective way to improve the participants' action based on their value. They also identified emotional and verbal barrier that would hinder the participants' actions. Session 1 aimed to analyse participants' thoughts, worries and current condition. In Session 2, the supervisor presented a functional analysis clinical case model to the participant and conducted a value analysis and experiential exercise. Session 3,4, and 5 were tailored to the participants and were based on the ACT book for therapist. In session 6, participants reflected on their experience, their plans for the future, and the value-based actions that were made.

In iACT, the intervention started with a face-to-face 60-minutes assessment session to analyse participants thoughts, worries, and current condition. Then, participants were signed up to *The Good Life Compass* program which consists of text, pictures and audio material. The program consisted of six modules, one for each value. Participants worked on the program at their own pace and were given assignments and exercise in each module. They got weekly feedback for each assignment. A final face-to-face meeting took place after the 6-week online intervention to summarize participants' experiences and observations in the process. The website was accessible for another 6 months after the completion.

Lappalainen et al., (2014) found that both interventions had a significant effect on psychological flexibility and mindfulness skills.

Mindfulness meditation

Jones et al., (2019) propose mindfulness meditation as an intervention for coping flexibility to promote health and well-being. mindfulness meditation emphasizes the ACT concept of engaging with the present moment without any judgement. It cultivates awareness of the present moment, which in turn increase the capacity for self-regulation, realization that some goals are not achieved, and redirecting strategies. These abilities are needed when a coping strategy is ineffective. Greater mindfulness is also associated with better cognitive control and lower ruminative thoughts (Jones et al., 2019).

Meditation and mindfulness are based on four component models that contribute to psychological well-being: conation (motivation, intention), attention, cognition, and

affect/emotion. The component attention is related to self-regulation, the ability to focus and not get distracted by unimportant things. As mindfulness meditation centres on focusing attention on a moment, mindfulness training should lead to an increased in cognitive flexibility and the ability to respond divergently (Moore & Malinowski, 2009). Eberth and Sedlmeier (2012) found that mindfulness-based stress reduction programs do not only work through mindfulness intervention but through psychoeducation or participants' expectations.

Jones et al., (2019) examines an eight-week training in which participants are required to meditate for 30 minutes daily for six days and are provided with two recordings about mindfulness meditation practice. In the practice, the instructors guide practitioners to focus their attention to a particular practice to gain a deeper understanding of what is occurring in one's own mind. Participants also need to complete online daily logs of their time spent meditating, their affect, and stress. The training sessions consist of a sitting meditation and a body scan. After receiving the instruction on sitting meditation, participants are asked to meditate for 30 minutes. During the meditation, patients are instructed to focus their attention to their breath. After the meditation, they are asked to share their experience on how often their mind wandered and what they did to bring their attention back. The body-scan meditation is a 30 minutes meditation in which participants lie on a mat, attend to their breath, and are asked to attend to various areas of their bodies. They are asked to note for any discomfort in particular area but without assigning any negative feeling toward the discomfort. After both practices are done, participants are given a 30 minutes recording about guided meditations, the body-scan, and sitting meditation and are asked to practice daily at home.

After the intervention, Jones et al., (2019) found that mindfulness meditation improved coping flexibility among novice participants. They also found that individuals that spent more time meditating after the intervention was done continued to have an increase in coping flexibility. Mindfulness training improved individuals' attentional performance, or their ability to focus, which positively related to cognitive flexibility (Moore & Malinowski, 2009).

Assessment

The Coping Flexibility Scale (Kato, 2012; Appendix B)

- The scale is developed to measure a person's ability "to discontinue an ineffective coping strategy" (Kato, 2012, p. 262)
- The scale consists of 10 items analysing two subscales: evaluation coping and adaptive coping. It is rated using a 4-point scale (0= *not applicable*, 1 = *somewhat applicable*, 2= *applicable*, and 3 = *very applicable*)

The Cognitive Flexibility Scale (Martin & Rubin, 1995; Appendix C)

- The scale measures three components of cognitive flexibility
- The scale consists of 12-items and 6-point Likert response format

The Coping Flexibility Scale (CFQ; Cheng, 2001; Appendix D)

- The scale is used to assess coping flexibility
- Respondents describe four controllable and four uncontrollable hassling experience in the last 3 months. Then, they are asked to describe all coping strategies used to face the situation. They are asked about their primary goal of using the strategies by choosing three options: “(a) to confront and change aspects of the stressful event directly (primary approach coping), (b) to change one’s thoughts and feelings about the stressful event (secondary approach coping), and (c) to avoid handling the stressful event (avoidant coping)” (Cheng, 2009, p. 476)
- They then self-rate the desirability, the impact, and the controllability of the event and the effectiveness of their strategies on a 6-point scale
- Each response that meet the goodness-fit criteria is score 1 and the ones that do not meet the criteria are scored 0
- The score is analysed by averaging the scores of eight items (events) and the goodness-of-fit score. A higher score indicates a match between coping strategies used and the demand

The Perceived Ability to Cope with Trauma (PACT) Scale (Bonanno et al., 2011; Appendix E)

- 2 scales that measure trauma focus (the ability to focus on processing the trauma) and forward focus (move beyond the trauma)
- The scale consists of 20 items.
- Each item is rated from 1 (*not at all able*) to 7 (*extremely able*)
- Measuring flexibility from PACT is done by combining the sum and discrepancy scores into a single variable. “First, a sum coping ability score is created by standardizing scores for the Forward Focus and Trauma Focus scales and then adding the scales; next, a coping polarity score is calculated as the absolute value of the discrepancy between the standardized scores for each scale; finally, a flexibility score is calculated as total coping ability minus coping polarity” (Bonanno et al., 2011, p. 121).
 - Sum: (Forward Focus + Trauma Focus).
 - Polarity: Forward Focus – Trauma Focus.
 - Flexibility: Sum – Polarity. (Bonanno et al., 2011, p. 121)

The Comprehensive Assessment of Acceptance and Commitment Therapy Processes (Francis et al., 2016; Appendix F)

- The assessment measures three components of psychological flexibility: openness, behavioural awareness, and valued action
- It consists of 23 items on a 7-point Likert scale (0= *strongly disagree* to 6=*strongly agree*)
- High scores indicate greater openness to experience, awareness, and valued action

Flexible Affective Processing Measurement (Genet & Siemer, 2011)

- The measurement involves task-switching with affective stimuli (negative and positive words) and affective and non-affective processing rules. For the non-affective rule, participants have to sort the words by the part of speech (adjective or noun) and for the affective rule, they have to sort the word by valence (positive or negative). The cue and valence word are presented simultaneously and have to be sorted according to the indicated rule. Words used for this measurement are from the Affective Norms of English Words list
- The categories are mapped to the right (noun and negative) and left (adjective and positive) response key
- Trials are set up in consistent block (words presented require the participants to press the same key for both cues) and inconsistent block (correct responses for the relevant cue mapped on to different response key than correct responses to the irrelevant cue)
- The task contains two practice blocks of 30 trials and the consistent and inconsistent blocks each contain 120 trials. Cues are randomly switched after two to five trials
- Task switching cost is calculated by analysing the difference in response time between task switching and task repetition. The cost on consistent and inconsistent blocks are calculated separately
- To do the task, participants are instructed to use their right-hand index finger to press the left-side key and their right-hand middle finger to press the right-side key
- There is no time limit for the participants to give their response

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Appendix A: Coping Flexibility Intervention Agenda

Table 1. Intervention Agenda (Schwartz & Rogers, 1994)

Session	Process	Goals	Assignment
1: Introductions and	Introduce each	Introduction of	“This is me.”
2: Dealing with Feelings	other and concept of coping flexibility. Facilitate discussion of loss and coping.	agenda; Establish rapport, trust. Dealing with loss.	
3: Image of Illness	“Draw your illness.”	Enhance awareness of use metaphor in the illness experience. Appreciate multiplicity of perspectives.	Pre-goal setting: Clarifying current practice.
4: Goal setting	Developing and honing goals to enhance quality of life.	Teach effective goal- setting.	Post-goal setting: Future goals and criteria of success.
5: Coping with Cognitive Problems	Feedback on neuropsychological battery. Discussion of cognitive coping strategies.	Designing compensatory strategies.	Customize organizer.
6: Support Session A	“Fishbowl” discussions with caregivers.	Improve communication with support person.	
7: Support Session B	“Requests and Declines” exercise.	Improve communication and re-design roles with caregivers	Ranking coping partners

8: Closure

Discuss changes/
impact of
intervention

Clarify and fortify
changes in coping.
Closure

Appendix B: The Coping Flexibility Scale

Kato (2012)

When we feel stress, we try to cope using various actions and thoughts. The following items describe stress-cope situations. Please indicate how these situations apply to you by choosing one of the following for each situation: “very applicable,” “applicable,” “somewhat applicable,” and “not applicable.”

1. When a stressful situation has not improved, I try to think of other ways to cope with it.
2. I only use certain ways to cope with stress. (R)
3. When stressed, I use several ways to cope and make the situation better.
4. When I haven't coped with a stressful situation well, I use other ways to cope with that situation.
5. If a stressful situation has not improved, I use other ways to cope with that situation.
6. I am aware of how successful or unsuccessful my attempts to cope with stress have been.
7. I fail to notice when I have been unable to cope with stress. (R)
8. If I feel that I have failed to cope with stress, I change the way in which I deal with stress.
9. After coping with stress, I think about how well my ways of coping with stress worked or did not work.
10. If I have failed to cope with stress, I think of other ways to cope.

The Evaluation Coping subscale items are 2, 6, 7, 8, and 9. The Adaptive Coping subscale items are 1, 3, 4, 5, and 10. Reverse-coded items are denoted with (R).

Appendix C: The Cognitive Flexibility Scale

Martin & Rubin (1995, p. 624)

TABLE 1
COGNITIVE FLEXIBILITY SCALE: ITEMS AND RESPONSE FORMAT

Strongly Agree	Agree	Slightly Agree	Slightly Disagree	Disagree	Strongly Disagree
6	5	4	3	2	1
1. I can communicate an idea in many different ways.					
2. I avoid new and unusual situations. (R)					
3. I feel like I never get to make decisions. (R)					
4. I can find workable solutions to seemingly unsolvable problems.					
5. I seldom have choices when deciding how to behave. (R)					
6. I am willing to work at creative solutions to problems.					
7. In any given situation, I am able to act appropriately.					
8. My behavior is a result of conscious decisions that I make.					
9. I have many possible ways of behaving in any given situation.					
10. I have difficulty using my knowledge on a given topic in real life situations. (R)					
11. I am willing to listen and consider alternatives for handling a problem.					
12. I have the self-confidence necessary to try different ways of behaving.					

Note.—Items marked (R) are reverse scored.

Appendix D: The Coping Flexibility Scale

Cheng (2001)

We are interested in understanding how people respond when they encounter stressful events in their lives. There are plenty of possible ways to handle stressful events, and each person may have her or his unique ways of handling stress. Please tell us what you have thought or done when you have experienced several stressful events within a specific period.

This questionnaire consists of six daily logs. You are required to complete each log on the specified night highlighted on the monthly calendar (see below). Please complete each log on every specified night. If you are too busy or have forgotten to fill in the daily log on a particular night, please complete the daily log on the next night. Please report the stressful experience and how you handle it on the day you complete the log (rather than the specified day) and write the date on which you complete it. Do not skip any of the log because missing data can affect the findings of our study.

Before you complete the daily log, please note the following important points:

- As mentioned earlier, you are required to complete a total of six events on six specified days respectively. Please treat each event as an independent event unrelated to the other five events. DO NOT recall and use your previous answers as a guidance to your answers in subsequent logs.
- We would like to know what you have actually thought or done during this stressful event. DO NOT report what you would like to think or do, what you should have thought or done, or what most people would think or do in that situation.
- People with different personalities may have different ways to evaluate and handle the same event, and so there are no right or wrong answers for any parts of this questionnaire. We ask that you give answers that are considered applicable only to yourself.

Please go through the daily log now and clarify any questions with the research assistant. If you have further questions when completing the daily logs at home, please contact the research assistant [name] at [phone number] on weekdays during office hours from 9 AM to 5:30 PM, or at [e-mail address] via the internet.

Your cooperation is of utmost importance to the completeness of our study and accuracy of the data. Thank you for your attention.

Date: _____

Section 1

Describe in a sentence or two the most stressful or irritating event you experienced today. This event should (a) demand considerable effort from you to handle it, (b) influence your well-being and/or your relationship with others, or both (a) and (b).

Have you experienced this event before?

Yes _____ No _____

How would you evaluate this event? Before rating the following items, please familiarize yourself with each of the rating guidelines.

1. How desirable do you think this event has been to you?

Rating guidelines: The extent of desirability depends on the amount of important and desirable (i.e., that you wish for) or important but undesirable (i.e., that you do not wish for) outcomes of the event:

- If you considered the event has elicited *a lot of* important outcomes that *you wish for*, please circle the number 6.
- If you considered the event has elicited *some* important outcomes that *you wish for*, please circle the number 5.
- If you considered the event has elicited *a few* important outcomes that *you wish for*, please circle the number 4.
- If you considered the event has elicited *a few* important outcomes that *you do not wish for*, please circle the number 3.
- If you considered the event has elicited *some* important outcomes that *you do not wish for*, please circle the number 2.
- If you considered the event has elicited *a lot of* important outcomes that *you do not wish for*, please circle the number 1.

2. How much impact do you think the event has had on you?

Rating guidelines: The extent of impact depends on the amount of influence you considered the event has had on you, such as your physical well-being, your psychological well-being, and your relationship with others.

- If you considered the event had *extreme* impact on you, please circle the number 6.
- If you considered the event had *great* impact on you, please circle the number 5.
- If you considered the event had *big* impact on you, please circle the number 4.
- If you considered the event had *some* impact on you, please circle the number 3.
- If you considered the event had *little* impact on you, please circle the number 2.
- If you considered the event had *no* impact on you, please circle the number 1.

3. How much control do you think you have had over this event?

Rating guidelines: Usually a stressful event consists of several aspects, and sometimes you can change some of its aspects but cannot change others. The extent of control depends on the amount of aspects you considered you could change in this event:

- If you considered you had total control that could change the entire event, please circle the number 6.
- If you considered you had *a lot of* control that could change about 80% of the aspects of the event, please circle the number 5.
- If you considered you had *quite a lot of* control that could change about 60% of the aspects of the event, please circle the number 4.
- If you considered you had *some* control that could change about 40% of the aspects of the event, please circle the number 3.
- If you considered you had *little* control that could change about 20% of the aspects of the event, please circle the number 2.
- If you considered you had *no* control and could not change any aspects of the event, please circle the number 1.

Note: These percentages are just listed for guiding your ratings. There is no need to calculate the exact percentages. Just roughly estimating the amount of control and changes you have had on the event will be fine.

4. If you find it difficult to evaluate the event in any of the above dimensions, please evaluate it using your own dimension and give a rating to it. Your valuable input may be beneficial in creating a new rating scale when we revise this questionnaire.

Section 2

Describe in a few words your coping strategies, that is, the *thoughts or behaviors* you have used to manage (e.g., master, tolerate, reduce, minimize) the stress associated with this event. We would like to know all your *actual efforts* made, and such thoughts or behaviors NEED NOT be completed or successful.

Please limit each page for the report of ONE coping strategy. If you have used more than one strategy, please use the supplementary forms attached to this package.

- a) What was your primary goal in using this strategy?

Rating guidelines: By goal, we mean any valued state, activity, or object that you would like to attain or maintain. Words such as *wish, hope, want, need, decide, going to do, try to do, and must do* reflect your goal toward this event. You may have more than one goal for this event, but please refer to the *most important or urgent* one.

When using this strategy, your primary goal was (please check the appropriate option):

- to directly handle the demands/problems associated with the event in order to improve its effect on you

- ____ to reduce or manage your distress or uncomfortable feelings associated with the event

b) How effective did you find this strategy was?

Rating guidelines: The extent of effectiveness depends on the extent to which the strategy is considered successful/unsuccessful in attaining or maintaining your goal described in (a).

- If you considered the strategy was *extremely successful* in bringing about your primary goal, please circle the number 6.
- If you considered the strategy was *successful* in bringing about your primary goal, please circle the number 5.
- If you considered the strategy was *somewhat successful* in bringing about your primary goal, please circle the number 4.
- If you considered the strategy was *somewhat unsuccessful* in bringing about your primary goal, please circle the number 3.
- If you considered the strategy was *unsuccessful* in bringing about your primary goal, please circle the number 2.
- If you considered the strategy was *extremely unsuccessful* in bringing about your primary goal, please circle the number 1

Appendix E: The PACT Scale

Bonanno et al. (2011)

Item	Forward focus	Trauma focus
Keep myself serious and calm	.78	-.03
Stay focused on my current goals and plans	.72	.08
Remind myself that things will get better	.70	.15
Look for a silver lining	.69	.13
Try to lessen the experience of painful emotions	.69	.02
Keep my schedule and activities as constant as possible	.65	-.15
Distract myself to keep from thinking about the event	.64	-.23
Find activities to help me keep the event off my mind	.64	.01
Enjoy something that I would normally find funny or amusing	.63	.09
Comfort other people	.62	-.07
I would be able to laugh	.56	.12
Focus my attention on or care for the needs of other people	.52	.11
Pay attention to the distressing feelings that result from the event	-.01	.77
Reflect on the meaning of the event	-.07	.76
Let myself fully experience some of the painful emotions linked with the event	-.01	.76
Spend time alone	.03	.48
Remember the details of the event	-.06	.46
Face the grim reality head on	.16	.44
Reduce my normal social obligations	-.06	.43
Alter my daily routine	.08	.41

Note. Bold text indicates items assigned to each factor.

Appendix F: The Comprehensive Assessment of Acceptance and Commitment Therapy Processes

Francis et al. (2016)

1. I tell myself that I shouldn't have certain thoughts
2. I try to stay busy to keep thoughts or feelings from coming
3. One of my big goals is to be free from painful emotions
4. I go out of my way to avoid situations that might bring difficult thoughts, feelings, or sensations
5. Even when something is important to me, I'll rarely do it if there is a chance it will upset me
6. I work hard to keep out upsetting feelings
7. I can take thoughts and feelings as they come, without attempting to control or avoid them*
8. I am willing to fully experience whatever thoughts, feelings and sensations come up for me, without trying to change or defend against them*
9. I get so caught up in my thoughts that I am unable to do the things that I most want to do
10. Thoughts are just thoughts – they don't control what I do*
11. It seems I am "running on automatic" without much awareness of what I'm doing
12. Even when doing the things that matter to me, I find myself doing them without paying attention
13. I rush through meaningful activities without being really attentive to them
14. I do jobs or tasks automatically, without being aware of what I'm doing
15. I find it difficult to stay focused on what's happening in the present
16. I make choices based on what is important to me, even if it is stressful*
17. My values are really reflected in my behaviour*
18. I am able to follow my long terms plans including times when progress is slow*
19. I can keep going with something when it's important to me*
20. I behave in line with my personal values*
21. I undertake things that are meaningful to me, even when I find it hard to do so*
22. I act in ways that are consistent with how I wish to live my life*
23. I can identify the things that really matter to me in life and pursue them*

Note: *Denotes a reverse-scored item.



For more information about R2 or to discover how you can bring the program to your organization, business or educational setting, please contact us.

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