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SELF-TALK A JEHO APLIKACE DO ZÁVODNÍHO VYTRVALOSTNÍHO PLAVÁNÍ

SELF-TALK AND ITS APPLICATION TO COMPETITIVE ENDURANCE SWIMMING

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Abstract

Competitive endurance swimming is a discipline that requires full focus and concentration to achieve peak performance. Athletes use various psychological strategies to achieve their full concentration. One of these strategies is self-talk, which has gained more popularity in recent years. Self-talk may be divided such as internal and external self-talk. Long-term self-talk is proven to be the most effective compared with short-term self-talk. Competitive swimmers can create their scripts with their selection of self-talk cues that they have evaluated with their coach as those that need to be improved. Self-talk can help competitive swimmers improve their starting reactions, improve their kinesthetic skills, muscular strength, endurance, and kinematics. The use of self-talk may enhance athletic performance through the improvement in learning achievements, improved athletic skills, and self-confidence.

Keywords: self-talk; competitive endurance swimming; sport psychology; mental performance; self-confidence

Souhrn

Závodní plavání je disciplina, která vyžaduje plnou soustředěnost a koncentraci k dosažení té nejlepší plavecké výkonnosti. Sportovci používají různé psychologické strategie k dosažení plné koncentrace v přípravě na jejich výkon. Jednou z těchto strategií je "Self-talk", kterému se za posledních pár let dostává čím dál více pozornosti v oblasti sportu. "Self-talk" se rozděluje na vnitřní a vnější. Dlouhodobé používání této strategie se ukázalo jako nejvíce efektivní v porovnáním s krátkodobou aplikací. Závodní plavci si mohou vytvořit svá personalizovaná skripta s vlastními "motivačními moty pro seberozpravu", které vyhodnotili s jejich trenéry, či metálními kouči jako ty, na kterých je potřeba pracovat za účelem vylepšení jejich mentální výkonnosti. "Self-talk" může pomoci závodnímu plavci vylepšit startovní reakci, kinestetické dovednosti, svalovou sílu, vytrvalost, a kinematiku. Použití této strategie může vylepšit sportovní výkonnost díky zlepšení učenlivosti dovedností, plaveckých dovedností, a sebevědomí sportovce.

Klíčová slova: self-talk; závodní plavání; psychologie sportu; mentální výkonnost; sebevědomí

Analytical part

Competitive endurance swimming is a sport that requires versatile skills and athletic abilities. Athletes are required to be prepared mentally and physically to be able to handle the high levels of fatigue that occur during prolonged intensive physical activity. Competitive endurance swimmers have to be mentally tough competitors to be capable of dealing with high levels of physical and mental fatigue. Self-talk has been found as one of the psychological functioning strategies that may improve athletic performance through psychophysiological improvement in athletes' performance. Self-talk is a cognitive technique used within the athletic population to increase motivation, excitement, and self-control. Self-talk helps to control emotions, and improves cognitive behavior, breath regulation,

worry, and anxiety control abilities (Hardy et al., 2001). Hatzigeorgiadis (2006) assessed the effect of motivational and instructional self-talk. The main aim of his study was to identify the functions of motivational and instructional self-talk, how athletes feel using each type of self-talk during different situations, and how to apply it to competitive endurance sports. Particularly, this study gathered modern literature regarding the self-talk usage of athletes who used self-talk for factor improvements such as improved muscle endurance, speed, kinesthetic skills, and ability to focus. This suggests that self-talk cues may be used to enhance concentration, but also serve different purposes depending on the content of specific cues. Athletes stated that motivational self-talk improved their effort during performance compared with instructional self-talk which was more beneficial during situations requiring attention, confidence, and anxiety control.

The application of self-talk can be used as a single performance-enhancing strategy, or it can be implemented along with additional psychological performance-enhancing strategies (Cumming et al., 2006). Self-talk cues differ by the type of used valence, overtness, self-determination, motivational interpretation, frequency, and function. Valence refers to the content of self-talk, whether the self-talk is positive or negative. Positive self-talk encourages the athlete, improves focus attention, and increases persistence. A negative self-talk is a form of self-criticism usually detrimental to athletic performance. Overtness refers to how the self-talk cues are verbalized (Rebner, 2017). Self-talk can be divided into internal, (covert) and external (overt) self-talk. Internal self-talk can be described as the" inner voice" inside an athlete's head, telling the athlete what to do and how to react and perform. External self-talk is served as self-talk by athletes talking out loud to themselves. Another aspect of self-talk is how self-determined the self-talk is, self-talk frequency, and the functions that self-talk serves for an athlete (Liu et al., 2022). Self-talk determination refers to how self-determined the self-talk cues are, self-determination ranges from assigned statements to completely chosen self-talk statements. Motivational interpretation refers to how athletes view the self-talk cues that they use. Motivational interpretation ranges from highly-motivating to de-motivating. Self-talk frequency helps to determine how often athletes use self-talk cues. Self-talk function refers to what function self-talk serves to an athlete. Two groups of self-talk mostly used nowadays within the athletic population are motivational and instructional self-talk (Rebner, 2017). Spontaneous self-talk is a form of self-talk where self-talk beliefs are created in an athlete's mind without any previous self-talk training. Coaches need to listen to their athlete's spontaneous self-talk because it can tell valuable information to the coach about athletes' performance beliefs such as: ("I can win that race"), goal orientation ("I don't want to lose"), or irrational beliefs ("I have to win"). Spontaneous self-talk is directly connected to emotions. Athlete's spontaneous self-talk may help to regulate their emotions. Spontaneous self-talk helps to use past outcomes and to foresee upcoming events (Latinjak et al., 2020).

It has been shown that youth athletes who regularly practiced self-talk improved their motor skills as well as psychological skills development (Hidayat et al., 2022). Athletes indicated that while using self-talk, they experienced more fun, interest, value effort, and competence. While athletes engage in self-talk at the beginning of their training and remind themselves of important training situations, the self-talk becomes briefer and less frequent as they progress in gaining self-talk proficiency (Park et al., 2020). Self-talk can improve attentional focus as well as social feedback that can be used as a learning progress information and mobilizer on athletes' learning efforts (Zourbanos et al., 2010). Due to the lack of gender and skill level differences for self-talk functions, it is suggested that self-talk interventions should be applied consistently throughout the sexes and skill levels (Hase et al., 2019).

Long-term self-talk has been found as the more valuable form of self-talk compared with short-term self-talk (Hatzigeorgiadis & Biddle, 2008). Walter et al. (2019) conducted a study where they assessed the effects of short-term and long-term self-talk intervention to test for the efficiency of self-talk duration. The long-term intervention was held for 8 weeks and the short-term intervention was held for one week. Athletes who performed the long-term self-talk intervention improved factors such as confidence, or decreased somatic state anxiety. (Walter et al., 2019) Compared with short-term self-talk, the long-term self-talk intervention was more effective in improving the performance-enhancing factors and improvement has been seen even beyond the intervention which shows a sustainable effect and automatization of long-term self-talk. Long-term self-talk increases self-efficacy, self-confidence, and athletic performance, and reduces somatic and cognitive state anxiety. Improvement in self-efficacy and self-confidence may help to improve swimming performance (Hatzigeorgiadis & Biddle, 2008).

Self-talk can have a performance-enhancing impact on swimming performance by increasing self-efficacy, effort, and energy expenditure, and by creating positive arousal. A study assessing the motivational self-talk (MST) in endurance athletes showed improvement in time to exhaustion (TTE) in group which performed MST training before their performance Pre (487 ± 173s) compared with their significantly better performance Post MST training (679 ± 251s) ($p = 0.021$), whereas the control group (CON) scored insignificantly worse results during their second trial Pre (531 ± 178s) and Post (510 ± 216s) ($p = 0.28$), (Wallace et al., 2017). This study proves that self-talk can improve attentional focus and maintain attentional focus under distraction and fatigue (Thibodeaux & Winsler, 2020). The use of self-talk can improve jump-off reaction from the starting block and overall improvement in kinesthetic skills (Boroujeni & Ghaheri, 2011). Participants in the study assessing the reaction time before and post-use of motivational self-talk showed that the use of motivational self-talk before performance significantly decreased the reaction time ($p = 0.001$). Self-talk can improve the flip-turn execution by improving muscular strength and kinematics. Particularly, motivational self-talk has been proven to increase muscular power and endurance, which can help endurance swimmers improve their athletic performance. Motivational self-talk influences an athlete's attention and decision-making ability of proper movement execution, which leads to an improvement in mental performance (Chang et al., 2014). Instructional self-talk is used in situations that require technical performance skills, which are related to improved swimming performance and faster flip-turn execution. Instructional self-talk can improve tactical skills, which are important in swimming to properly execute the racing strategy during swimming performance (Hardy, 2006).

Instructional self-talk also improves kinesthetic skills, which helps to react faster on the starting block, and faster muscle recruitment during the race. Specifically, instructional self-talk has a positive impact on athletic performance during the execution of practiced skills and faster mistake correction. Results of this study showed that athletes in mental states such as low mindfulness ($M = 27.61 \pm 5.88$), or in under pressure mental state ($M = 29.84 \pm 5.16$), improved their athletic performance using instructional self-talk compared with unrelated self-talk (Liu et al., 2022). Another study that assessed the effect of self-talk on the effectiveness of forehand and backhand strokes in tennis players showed a 45% improvement in tennis players who used instructional self-talk compared with baseline in the backhand and forehand strokes. (Rebner, 2017).

The instructional self-talk is more effective for novel tasks than for already learned tasks, therefore the more athlete masters the tasks the less need is to use the instructional self-talk. Instructional self-talk serves as a tool for cognitive control which can be used during the race when a swimmer needs to use cognitive control to properly strategize the race and execute adequate swimming technique. Instructional self-talk is a useful cognitive tool in situations, that require athletes to execute the motor tasks precisely. Athletes suffering from low mindfulness disposition were able to overcome this limitation by use of instructional self-talk (Liu et al., 2022). Instructional self-talk cues serve as a tool to trigger the automatic execution of the skill and to regulate an athlete's swimming effort during the endurance performance. Instructional self-talk cues can serve as a function of strategic cognitive processing during endurance performance (Hidayat & Budiman, 2014).

Dissociative self-talk is a type of self-talk that uses the strategy of reducing the quantity of mental energy required for concentration on the task during the endurance exercise. The lower the exercise intensity gets, the greater the percentage of thoughts that become dissociative (McCormick).

Interval-integrated self-talk exercises may increase the VO_{2max} and fartlek exercises' effectiveness in endurance athletes. Pre to Post-increase in VO_{2max} along with integrated fartlek exercises showed significant differences after the use of self-talk. These findings show that the use of self-talk in endurance athletes will lead to greater performance at a certain relative intensity and, therefore increase in VO_{2max} (Deni, 2021). In this study, athletes who completed the self-talk training program with fartlek training improved their performance by 11.71% from Pre (42.417 ± 3.67) (ml/kg/min) to Post (45.778 ± 3.795) (ml/kg/min), and group which completed the self-talk training program along with interval training improved their VO_{2max} performance by 36.91% from (41.387 ± 3.758).

Effects of self-talk on mental performance were observed through qualitative procedures using specialized questionnaires such as the Competitive State Anxiety Inventory-2 (CSAI-2), used by Hatzigeorgiadis & Biddle (2008) to evaluate the intensity and direction of pre-competition cognitive and somatic anxiety. In general, these questionnaires are designed to evaluate athletes' use, and type of

self-talk, or other psychology-related factors during situations eliciting feelings such as anger, anxiety, excitement, and euphoria. The goal of the specific questionnaires is to evaluate how the self-talk cues may assist in either regulating or boosting the desired feelings and whether self-talk cues are effective in improving mental athletic performance. Quantitative procedures have been used in situations, where researchers were evaluating the impact of self-talk on the improvement of athletes' performance based on the improvement in psychophysiological factors. In this overview, quantitative methods such as the VO_{2max} test (Deni, 2021), and TTE (Time to exhaustion) (Blanchfield et al., 2014), were used to measure the performance of athletes either assigned to a self-talk group or control group. Along with VO2Peak, Wallace et al. (2017) measured peak power output and recorded the highest power output that athletes achieved during the last full 1-min stage. For factors such as strength or speed improvement caused by the use of self-talk, researchers used sport-specific assessments measuring the effect of self-talk such as the softball overhand throw for distance (Chang et al., 2014), or basketball assessment for speed (Theodorakis et al., 2001). Reaction time measurement is a method that has been used to measure the prior and post-self-talk usage and its impact on vertical jump reaction time (Boroujeni & Ghaheri, 2011). For accuracy assessments, researchers used particular assigned sports interventions to test the accuracy improvement after the self-talk intervention. For example, Cumming et al. (2006), used a performance assessment based on dart-throwing accuracy using facilitative imagery and self-talk. Using facilitative imagery and self-talk has significantly improved athletes' dart-throwing performance compared with the control group. Assessment tests such as shuttle run were used to measure the level of physical fatigue after the use of self-talk (Galanis et al., 2022). To test for a self-talk effect in no-pressure and under-pressure situations, a heart rate monitor was used to test for differences in each self-talk group (Liu et al., 2022). Thibodeaux & Winsler (2020) used an observational method during the participants' tennis matches and after their matches, they recorded their performance and speech using a specialized scale to assess the effect of self-talk on their performance.

Self-talk applications can strengthen the mood, and improve athletes' ability to relax during highly demanding situations and maintain an optimal level of motivation. Self-talk intervention also improves the ability to cope with difficult situations and effort control. Self-talk serves specific adaptive functions that can be strategically deployed. The highest effect of self-talk is when self-talk is used to learn or refine a skill. Females are more likely to use self-talk early in the season and during skill performance than male athletes. Male athletes tend to use neutral self-talk more than females (Khanbeygi & Banisadi, 2021). Neutral self-talk refers to self-talk cues that are neither positive nor negative. Particular examples of neutral self-talk in endurance sports are self-talk cues such as: ("Stay focused", "Relax", and "Keep up the great technique") (Gammage et al., 2001).

Athletes are encouraged to adopt and train strategic self-talk systematically, but also during physically and mentally high-demanding situations to support athletic performance (Galanis et al., 2022). Motivation, self-talk, and athletic performance are related to each other. There is a mediating effect between motivation and athletic performance. Self-talk helps athletes use appropriate approaches to control and organize their thoughts to focus and get motivated to execute an event or task as best as possible. Athletes may benefit from psychological programs during practice and competition. Specifically, motivational self-talk helps to develop the confidence to execute newly learned tasks during competition. Motivational self-talk can be used as well for advanced and experienced athletes during their task execution to increase their cognitive mechanisms and psychological skills. Motivational self-talk in athletes improves psychological skills and mechanisms such as self-confidence, focus attention, automaticity, emotion, cognitive control, and effort. The learning process of self-talk should be continuous in practice as well as during competition. Athletes were able to improve their athletic performance after they performed long-term self-talk application during their practices and competitions, particularly after the use of long-term motivational self-talk cues training (Olisola & Olaitan, 2021).

The use of self-talk to improve self-efficacy can be beneficial to coping with the cognitive component of anxiety-eliciting situations. Self-talk during anxiety-eliciting situations should be focused on positive gestures ("You can do it"), or to create a deactivated state ("Calm down"). Anxiety-controlling self-talk cues such as: ("Calm down, relax"), can effectively reduce cognitive anxiety. Another way how to cope with an athlete's negative anticipation is to focus attention on performance knowledge. Self-

talk instruction in anxiety-eliciting situations should be more focused on the distal external focus of attention, than on the internal focus of attention (Latinjak et al., 2020). This study aims to analyze the available self-talk literature as well as to find effective strategies for self-talk application in endurance swimming.

Methodology

The literature analysis and synthesis were done through the systematic review of self-talk research articles. Thematic analysis was used to identify important findings in self-talk literature such as self-talk categorization and its application to athletic performance. Conceptual synthesis was used to connect hypotheses and strategies from multiple research articles to create a theoretical framework for the structure of the review.

Comparative analysis was used to compare self-talk findings to make estimations in used methodologies and intervention unique traits in various studies. The synthesis was used for the critical evaluation of strengths and weaknesses of used self-talk research to provide an objective understanding of the connection between self-talk and athletic performance.

The data comparison of self-talk interventions and data collection was an important step in determining the overall impact of self-talk on particular factors in athletic performance. The main focus of this review was to estimate the most effective type of self-talk that would suit the needs of endurance athletes with the main focus on pre-race reduction of sport-related anxiety, optimal athletic arousal, and focus on performance, as well as the most suitable self-talk strategy for athletes to use during the race to maintain high focus, reduce tiredness, and increase energy.

An extensive compilation of studies was searched to find the applicable literature. The search engine used for the literature selection was to find literature on self-talk strategies. This review article attempts to connect the literature on self-talk strategies. Successful application of self-talk strategies may create a positive state of mind for competitive endurance swimmers. For the endurance improvement assessment with the use of motivational self-talk, the literature selection focused preferably on the competitive endurance population. Due to a lack of research focused on self-talk strategies on endurance swimmers and the swimming population in general, self-talk strategies assessed in different endurance sports were used in this review. To find relevant articles, terms such as "self-talk and its application to competitive endurance sports", "instructional self-talk and its application to competitive sports", or "types of self-talk in sport psychology" were used to find the appropriate literature sources. The inclusion criteria used for this review was the use of published self-talk literature.

Data extracted from used studies consisted of results of self-talk effectiveness on athletic performance demonstrating improvement in factors such as improved endurance, speed, strength, or accuracy. Quality assessment has been used to diversify research methodologies and approaches to get an objective overview of self-talk literature. This overview consists of research that used a controlled experiment, observational and cross-sectional studies, and Pre-Post research designs.

Synthetic part

During training and competition, athletes reach their maximal physical and mental effort to perform best of their abilities. Motivational self-talk refers to cues that are motivating and encouraging in tone. Motivational self-talk cues should be specifically designed to support the swimming performance. During the practice and competition, athletes need to use supportive cues such as ("Go, you can win that race"). Furthermore, coaches need to be focused on individual factors within each training group to particularly fit their athletic mental performance needs during training and competition to reach the desired outcomes such as increased strength, athletic arousal, and improved endurance capabilities. Cues such as ("I worked so hard, I can win that race") need to be repeatably used during self-talk practice to achieve the long-term self-talk learning benefits. Motivational self-talk can significantly reduce the rate of perceived exertion during the race and training, which can significantly improve endurance performance (Blanchfield et al., 2014). Bingöl & Yildiz (2021) stated that there is a direct connection between motivation and athletic performance, and creating motivational cues from self-talk may decrease pre-competition anxiety, and even out athletic arousal. By creating this state of mind, motivation and self-talk will work synergically as a performance-enhancing tool to improve athletes' performance. The self-talk during athletic performance should mainly serve a motivational

function since prolonged performance causes factors such as tiredness, loss of motivation, and loss of focus (Basset et al., 2022).

Self-talk that athletes should use before competition should include instructional self-talk cues. Instructional self-talk helps in technical, tactical, and kinesthetic skills, such as athletes telling themselves before their race: ("focus on turns and streamlines"). Instructional self-talk should be mostly implemented before the competition, or the first half of the race, and in situations requiring technical, tactical, and kinesthetic skills such as finishing with a focus on over-touching the other competitors. Incorporating self-talk cues into swimming training and competition performance serves to represent the planned movement in the actual movement process. Swimmers need to understand why they need to perform at a high level and how it can be achieved ("I need to compete exactly how I trained for it"), or ("I will stick with my racing strategy, no matter how other competitors are racing"). Instructional self-talk behavior serves as a rule that functions to regulate behavior to achieve goals. Instructional and dissociating self-talk serves as a calming tool before the competition: ("Do not panic and perform the great technique that you trained"). The process of incorporating the self-talk cues to master the motor skill is a process of self-efficacy activation. Self-efficacy activation is done through past performance accomplishments, victorious experience, and verbal persuasion: ("I have done this in the past and this time I trained even harder, I can do it") (Zourbanos et al., 2010).

Athletes tend to use positive self-talk during the winning situations and neutral and negative self-talk during the neutral and losing situations. The longer the duration of the race, the more negative self-talk usage occurs within the athlete (Candra et al., 2020). The goal is to teach athletes how to implement motivational and instructional positive self-talk cues in situations such as the part of the race where their level of athletic arousal, energy, and cognitive functioning decreases due to the high level of physical exertion. Athletes need to learn to use positive self-talk even during negative and neutral situations to become mentally tougher competitors. A study done on endurance athletes showed that negative self-talk during aerobic exercise significantly increases released cortisol levels due to higher experienced levels of stress on athletes.

Athletes who applied negative self-talk during endurance exercise also reported a significantly higher rate of perceived exertion (Basset et al., 2022). Negative self-talk should not be used by athletes unless an athlete and coach observe that the athlete performs better under the negative self-talk conditions. Sometimes athletes may benefit from negative self-talk because negative self-talk serves a motivational function in that moment. An example of such a negative self-talk cue would be: ("They say I cannot achieve my goals, it is my turn to prove them wrong"). Athletes who used motivational self-talk cues before competition reported better awareness of the negative self-talk frequency, particularly when the negative self-talk was used and what negative self-talk cues they used during the competition (Theodorakis et al., 2001). Athletes who have optimal levels of athletic arousal and self-confidence are the type of athletes, for whom we can implement negative-challenging self-talk. When implementing negative self-talk, athletes need to rephrase negative self-talk cues into challenging negative self-talk cues and use them actively with motivational self-talk statements (Wallace et al., 2017). Negative-challenging self-talk can motivate some athletes and might impair the performance of others ("My arms are hurting, but I can finish strong") or use it as a pre-race behind the blocks impairment strategy for other athletes ("This race is going to be so long and painful, but I can do it") (Hardy et al., 2005).

Athletes who interpreted their pre-competition anxiety symptoms as facilitative reported less negative self-talk during competition. Athletes need to learn that anxiety symptoms commonly occur in the athletic population during training and competition, but they must become familiar with how to react to it to reduce negative self-talk during the competition rather than solely concentrating on how to reduce anxiety symptoms. If an athlete learns how to get familiar with how to perceive pre-competition anxiety symptoms, they are more likely to reduce their negative self-talk during competition. Athletes should be aware of discrepancies between goals and their performance. To minimize the possibility of significant discrepancies and reoccurrence of negative self-talk, athletes and their coaches should be estimating systematic goals and achievements that are within their reach. Personalization of self-talk cues will improve the ability to remember self-talk cues and apply them during high-demanding situations before and during swimming performance (Hatzigeorgiadis, 2006).

The application of instructional and motivational self-talk is the most effective tool to enhance athletic performance because competitive endurance swimming includes both fine and gross motor

skills. The motivational self-talk goal in competitive endurance swimming is to change the perception of how swimmers can make it better in a swim race, particularly believing that the swimmers are prepared to perform their best. Swim coaches should create a short mantra, that contains relevant information, and leaves a significant emotional impact on the athlete and the mantras that can be used several times a day ("I trained hard enough to win this race, and I will win it"). An important note is that the coaches need to teach their swimmers a particular way that works best for an athlete. For endurance swimming, the level of arousal should be optimal to not over-swim the race which would cause early fatigue and therefore be detrimental to their swimming performance. Swimmers need to be ready for the race by knowing what they need to focus on. Pre-competition race visualization helps athletes to properly execute what they trained for and constantly repeat it. When an athlete is unsuccessful in one race, the coach needs to remind the athlete that there are upcoming races and that one bad race does not ruin their entire competition if the swimmers are properly prepared to perform their best.

Conclusion

The use of self-talk is a proven psychological strategy to improve mental athletic performance. It can be used as a single strategy, or used with other sport psychology strategies. Self-talk has a significant impact on athletic performance through the improvement in factors such as an increase in learning achievements, improved athletic skills, and self-confidence. Furthermore, self-talk can be used to reduce stress and performance-related anxiety in athletes before and during their athletic performance

Self-talk may serve the motivational function, which may help athletes stay motivated when negative thoughts and factors such as fatigue or anxiety appear. Positive self-talk has been found to serve a motivational function by creating a challenging mental state in athletes who regularly exercise self-talk strategies. Instructional self-talk should have been used to improve skills requiring certain levels of technical skills that need to be mastered, or as a tool to become more focused, have better attention, and reduce pre-competition-related anxiety.

The use of self-talk may improve motor and psychological skills development. It has been shown that self-talk may decrease the rate of perceived exertion in endurance athletes by targeting the changes in perception of effort. This impact of self-talk showed an increase in endurance performance because endurance athletes were able to sustain higher effort in athletic performance for a longer period. Self-talk learning can be enhanced by creating written scripts, which will help athletes memorize self-talk tasks and create or modify self-talk cues.

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