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## ARTICLE

### The Impact of Infographics on Disseminating Sport Psychology Resources with Athletes

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## Abstract

**Background:** Effective knowledge dissemination is critical for ensuring that research findings reach their intended audiences and inform practice. In sport psychology, there is a growing call for improved strategies to bridge the research-to-practice gap. Infographics, which visually synthesize key concepts, are a promising tool for engaging athletes and enhancing knowledge retention. Despite their growing use across fields, their effectiveness in sport psychology remains underexplored. **Purpose:** This study evaluated the impact of a sport psychology infographic on athletes' knowledge comprehension and retention. **Methods:** A two-part research design including a cross-sectional survey and a longitudinal follow-up was employed: (Part 1) participants assessed the infographic's visual appeal, content quality, and persuasiveness as well as reported their intention to seek additional resources and share the infographic; (Part 2) a subset of participants completed a follow-up survey one month later to assess knowledge retention. **Results:** Most participants were satisfied with the infographic's visual appearance (71.7%) and demonstrated a high level of content understanding (75.5%). A majority expressed intentions to seek additional resources (73.8%), share the infographic (65.5%), and implement the information provided (55.2%). A Friedman's test revealed significant differences in the sequence of recalled information compared to the original infographic layout,  $N = 13$ ,  $\chi^2(5) = 25.703$ ,  $p = .001$ . **Conclusions:** These findings support the use of infographics as an effective knowledge translation product in sport psychology, with positive outcomes in athlete engagement, comprehension, and retention.

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## Introduction

The development and strategic sharing of research findings have been a valuable avenue for researchers to maximize impact and promote informed decision-making within various populations (Lafrenière et al., 2013). In the field of sport psychology, recent calls to action have highlighted the need of effective knowledge dissemination practices (Leggat et al., 2023; Fullagar et al., 2019;

Schaillée et al., 2019). As such, researchers have developed various knowledge products including infographics, workshops, and module-based learning, to translate information for various populations (e.g., para-athletes, youth athletes; Ely et al., 2024; Holt et al., 2018). A notable limitation, however, has been the insufficient evaluation of the knowledge product itself (i.e., Is this product an effective means for translating

and disseminating its intended information to a particular audience?). The present study aims to fill this gap by evaluating the effectiveness of an infographic designed to disseminate sport psychology information, specifically psychological skills training (PST), to athletes.

Over the past 40 years, researchers in sport psychology have discussed the practical implications of applied research within the field, particularly through the development and delivery of PST programs for athletes (Christina, 1989; Martens, 1979, McCullagh, 1998). PST programs involve the selection and application of various mental skills (e.g., imagery, goal setting, arousal regulation) to enhance both performance and fulfillment in sport participation. For effective implementation, individuals must learn and apply various skills. While some may work with a professional (e.g., mental performance consultant) to learn such content, others rely on learning and applying PST independently, as professionals can be financially burdensome (Dean et al., 2022). For those who are self-taught, the sheer amount of available information can be daunting, making it challenging to identify the most important insights (Zhang et al., 2024). Moreover, sport psychology has faced challenges effectively communicating this information to those who would benefit (i.e., athletes) in a manageable way (Ely et al., 2020; Holt et al., 2018). For instance, Ely and colleagues (2020) recently conducted an archival review of applied imagery research over the past 25 years, revealing that numerous practical recommendations appeared consistent across time. One such recommendation was that coaches and athletes should be educated on how to use imagery. While

this makes logical sense, what is noteworthy is that this recommendation was made repeatedly by researchers, from 1995 to 2019, suggesting that this information had yet to be adopted for real-world application (Ely et al., 2020). This finding highlights the reality that sport psychology information (e.g., imagery) is not adequately being transferred to the necessary target audience, requiring researchers to be more intentional in their knowledge translation efforts.

Researchers have noted the ongoing concerns regarding a prevalent research-to-practice gap, whereby the research being conducted is not being applied in practical, real-life settings (Ely et al., 2021; Fullagar et al., 2019; Leggat et al., 2023). Since the practical goal of PST research is often to promote psychological skill development and enhance performance, it's essential that these findings are made accessible to the athletes who stand to benefit most (Gould, 2016). Creating knowledge translation products can be an effective way to bridge the persistent gap between research and practice in this field.

Knowledge translation, a topic of interest in sport psychology (Eklund & Crocker, 2019), is a dynamic and iterative process focused on how researchers and knowledge users (e.g., athletes, coaches, consultants) interact to improve the application of knowledge (Straus et al., 2013). In essence, knowledge translation research explores the ways in which researchers and knowledge users communicate to share and disseminate knowledge on a given topic. A prominent framework for exploring knowledge translation is Graham and colleagues' (2006) knowledge to action process. This framework is organized into two parts. The first is the knowledge creation funnel, which details how researchers use their

knowledge and access to the research literature to develop practical recommendations on a topic. From here, researchers develop knowledge products which are thought to be easily digestible and available for wide dissemination (Graham et al., 2006). Knowledge products may include but are not limited to websites (e.g., Farhat et al., 2022), learning modules (e.g., Ely et al., 2024), social media posts (e.g., Holt et al., 2018), and infographics (e.g., Coyne et al., 2021; Muir & Munroe-Chandler, 2020). The second part of this framework is referred to as the action cycle, which includes eight iterative steps designed to assist the implementation, evaluation, and sustained use of knowledge translation initiatives or programs (Graham et al., 2006). Although the iterative steps of the action cycle explore how knowledge is (not) being disseminated, evaluation at this stage is predicated by the development of sound and effective knowledge products (Grimshaw et al., 2012).

Within the field of sport psychology, workshop interventions are a commonly used knowledge translation product aimed at enhancing knowledge exchange between researchers and the targeted population; particularly for PST interventions (Weinberg & Gould, 2023). Researchers and applied practitioners often implement workshops to aid in education and acquisition of psychological skills (Munroe-Chandler & Hall, 2025). While valued for their interactive nature and hands-on learning experiences, the literature cites several barriers to workshop intervention effectiveness. Common issues include logistical challenges, such as time constraints, funding limitations, and insufficient access to resources (Partl & Hussein, 2024). Additionally, some studies highlight issues

relating to participant engagement, varying levels of prior knowledge, and instability of workshop outcomes (Partl & Hussein, 2024). Given these barriers, it is understandable researchers have expressed interest in determining if other types of knowledge products can be effective for knowledge mobilization (e.g., infographics; Muir & Munroe-Chandler, 2020).

One type of knowledge product that has received considerable interest for its utility in knowledge translation is the infographic. An infographic visually communicates information through images and text in a colorful and concise way (McCrorie et al., 2006; Muir & Munroe-Chandler, 2020). By combining images and text, infographics can present information in a digestible manner (Dunlap & Lowenthal, 2016). For instance, studies have shown that infographics are considered easier to understand compared to written summaries or journal articles (e.g., Ozdamli et al., 2016; Thoma et al., 2017). This ease of understanding is thought to also contribute to effective memory recall of information presented on an infographic (Muir & Munroe-Chandler, 2020), as less time is needed to process visual information compared to text alone (Smiciklas, 2012). As Infographics minimize various barriers to engaging with information, alongside utilizing a narrative approach to dissemination of information, there is an increase in likelihood to engage with and learn from infographics for a wide range of topics (Murray, 2021). Interestingly, data on one's ability to accurately recall information from infographics are inconclusive. Coyne and colleagues (2021) assessed participant recall one month after the delivery of an infographic on health and physical activity promotion

during the COVID-19 pandemic. Results showed that roughly 70% of participants successfully answered knowledge accuracy questions. Conversely, Wang et al. (2019) used a similar protocol in their study and only found 43% of participants accurately recalled information four weeks after viewing an infographic. Despite such inconsistencies, studies have shown participants are generally satisfied with the quality of infographics (e.g., Coyne et al., 2021; Ozdamli et al., 2016). As such, acknowledging the perceived benefits (e.g., accessibility, feasibility, ease of understanding), infographics have become a prominent option to fill some gaps from traditional workshop style instruction (Martin et al., 2019). The use of infographics within several domains including health (Goodyear-Smith et al., 2008), mental health (Muir & Munroe-Chandler, 2020), and sport (Holt et al., 2018), indicates the perceived value of these knowledge mobilization products to encourage access to, and understanding of, knowledge and information. However, while researchers have begun to explore the effectiveness of infographics (e.g., Coyne et al., 2021; Wang et al., 2019), further research is needed to evaluate this knowledge product (Muir & Munroe-Chandler, 2020).

It is important to disseminate research-based recommendations to athletes (Ely et al., 2020; Gould, 2016). However, there are numerous limitations to traditional knowledge products i.e., workshops), such as time constraints and access to appropriate resources (Partl & Hussein, 2024). Due to the utility of infographics, it is critical to understand how they can be used as an alternative dissemination product to address the research-to-practice gap. While the dissemination of results is valued by many researchers, the

impact of their knowledge products is often not adequately evaluated (Coyne et al., 2021). With the aim to bridge this gap, the purpose of the present study was to evaluate the impact and retention of information from an infographic designed to disseminate sport psychology content, specifically PST, to an athlete population. Within this study, impact is defined as increasing awareness and understanding of a particular topic to an intended audience (Coyne et al., 2021; Muir & Munroe-Chandler, 2020).

## Methods

### *Study Design*

This project employed a two-part research design, including a cross-sectional survey (Part 1) and a longitudinal follow-up (Part 2). Participants were asked to view an infographic (see Figure 1) and complete a survey that evaluated various components of the infographic (Part 1). A subset of those participants completed a follow-up survey one month later that assessed their knowledge retention of the infographic (Part 2).

### *Participants*

#### *Part 1*

A total sample of 122 athletes were recruited to complete an online survey that contained an infographic (i.e., created for this study; see Figure 1) upon which they were asked questions regarding their comprehension and subjective appraisal of the infographic. Participants' age ranged from 18-36 (Mage = 23.16, SD = 5.35), 66 self-identified as male (54.1%) and 56 as female (45.9%). Participants were asked to self-identify their ethnicity, and the majority identified as White (n = 94; 77%). Primary sport participation of the sample encompassed a wide range of sports, but

## Infographics for Sport Psychology Resources

most notably included athletics (n = 28; 22.9%), soccer (n = 22; 18%), basketball (n = 11; 9%), volleyball (n = 7; 5.7%), and baseball (n = 7; 5.7%). Additional participant demographic data was also collected and is presented in Table 1.

### Part 2

A subset of those participants (N = 17) agreed to complete a second survey have sought out additional resources within the last month.

through two modalities: a recruitment email and social media. The recruitment email was sent out by the Athletic Director at an Ontario university and an NCAA DII institution, and recruitment posters were posted on social media. Interested participants completed the survey package by accessing the Qualtrics™ survey link and reading one-month later to evaluate their recall of the sequence of mental skills displayed on the infographic from the previous survey. Moreover, they

**Table 1: Participant Demographic Data.**

| Demographic Characteristic                    | Category                 | Frequency (n = X) | Percentage (%) |
|-----------------------------------------------|--------------------------|-------------------|----------------|
| Current level of sport                        | Recreational             | 13                | 10.7           |
|                                               | Collegiate               | 89                | 73             |
|                                               | Professional             | 5                 | 4.1            |
|                                               | National                 | 13                | 10.7           |
|                                               | International            | 2                 | 1.6            |
| Primary Sport Participation                   |                          | 28                | 22.9           |
|                                               | Athletics                |                   |                |
|                                               | Soccer                   | 22                | 18             |
|                                               | Basketball               | 11                | 9              |
|                                               | Volleyball               | 7                 | 5.7            |
|                                               | Baseball                 | 7                 | 5.7            |
| Time spent playing current sport              | Other                    | 47                | 38.7           |
|                                               |                          |                   |                |
|                                               | 10 years or less         | 70                | 58             |
|                                               | 10+ years                | 51                | 41.6           |
| Experience with sport psychology practitioner | Yes                      | 51                | 41.8           |
|                                               | No                       | 69                | 56.6           |
|                                               | Unsure/Prefer not to say | 2                 | 1.6            |

*Note:* Missing 1 participant response from length of time playing current sport. Primary sport participation was self-reported, therefore only top five most prominent sport participation was included in the table.

## Procedures

### Part 1

Prior to commencing the study, the research team obtained university ethics approval, as the study adhered to the guidelines established by the Declaration of Helsinki. Participants were recruited

were asked if they have implemented any of the mental skills into their training, alongside whether they through and providing their informed consent prior to participation in the study. Participants then were shown the Mental Skills Pathway infographic (see Figure 1) and

were required to view the infographic for a minimum of 10 s prior to continuing with the online survey questions (i.e., advancement through the survey was locked until the minimum 10 s had passed). This was implemented as previous research considers a minimum of 10 s as a bottom range for engagement with visual graphics (Wang et al., 2019). Once the participant finished viewing the infographic, they were prompted to answer survey questions evaluating the infographic (see Table 1). Finally, brief demographic indicators were obtained. Once their survey data were collected, participants were thanked for their time and offered an opportunity to provide their email for one of the following: (1) enter a draw to win one of six \$25 Amazon gift cards, (2) enter the above draw and be sent a short follow-up survey in approximately one month, which would allow them to be eligible to enter an additional draw for one of two \$25 Amazon gift cards, or (3) exit the survey entirely without entering any draw.

### **Part 2**

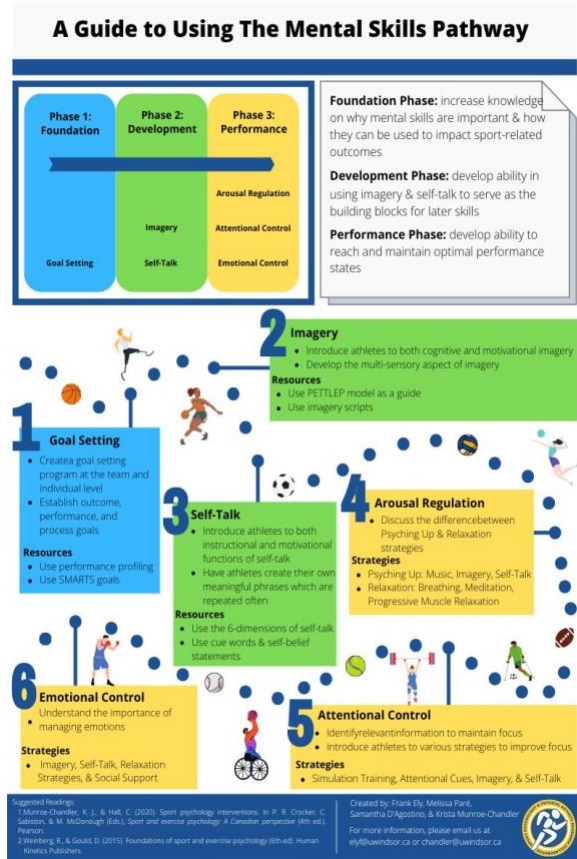
Participants who indicated interest in being contacted for a short follow-up survey were emailed one month after their completion of the initial survey. The University of Research Ethics Board approved ongoing consent procedures for the one-month follow-up and participants were not required to re-consent to complete the short survey. If the contacted participant wanted to complete the follow-up, they were instructed to click the Qualtrics™ survey link and complete questions relating to their retention of the knowledge presented on the infographic from Part 1, and whether they have either implemented the mental skills or sought out additional resources within the last

month. Once the survey data were collected, participants were thanked for their time and offered a second opportunity to enter a draw for one of two \$25 Amazon gift cards or exit the survey entirely without entering the draw.

### **Infographic Design**

The purpose of the infographic (Figure 1) was to provide the user (in this case athletes) with a proposed learning sequence of mental skills. A secondary aim was to gain their evaluative perceptions of the infographic, alongside their learning intentions and retention of knowledge. There are three components to infographics: 1) visual elements, 2) content elements, and 3) knowledge elements (Basco, 2020). The visual elements were guided by the recommendations of Muir and Munroe-Chandler (2020) for infographics in the sport psychology domain. The infographic used multiple design elements such as intentional use of colour, a list-based design, and appropriate use of graphics and icons (Figure 1). The content elements consisted of a description of six mental skills, which included a brief description of the skill and resources or strategies to implement the skill into a sport-setting. Suggested readings (c.f. Munroe-Chandler & Hall, 2020; Weinberg & Gould, 2023) were provided if athletes required more detailed information. The desired knowledge elements were to suggest the sequence in which the six mental skills are best learned within a PST program.

Figure 1. Infographic for Dissemination.



## Measures

### Part 1. Evaluation of Infographic

The infographic was evaluated on multiple criteria across a 5-point Likert scale (Coyne et al., 2021). Participants were asked to respond to a subset of questions that evaluated the infographic's visual appearance and perceived quality of understanding, alongside the participant's intention to seek additional resources and likelihood of sharing the infographic, and finally the persuasiveness of the infographic. While survey questions were not pilot tested, questions were adapted from previous iterations of work conducted by members of the research team and adapted to fit the context of the present study (cf. Coyne et al., 2021). Refer to Table 2 for the exact worded questions.

### Part 2. Knowledge Retention

Knowledge retention was evaluated through participants' ability to recall the sequence of the six mental skills. Participants were asked to rank the six mental skills (i.e., arousal regulation, attentional control, emotional control, imagery, goal setting, and self-talk) in the order presented on the infographic from 1 (*learned first*) to 6 (*learned last*) in order. Following, participants were asked to indicate *yes* or *no* as to whether they have implemented any of the six mental skills in their last month of training, as well as whether they have sought out additional resources on any of the six mental skills, with an opportunity to explain the resources they have sought out, if desired.

## Data Analysis

### Part 1

All statistical analyses were conducted using Version 29.0.2.0 IBM SPSS (IBM Corp, 2024). Descriptive statistics were calculated to provide an overview of the data, computing percentages and frequencies, alongside means and standard deviations.

### Part 2

To assess the differences between the sequence and the participants' recall of the rank order of mental skills, a Friedman's test was conducted ( $p > .05$ ). This non-parametric test was used as the data did not meet the assumptions of parametric tests. Particularly, normality was assessed using Spearman's rho tests and visual inspection Q-Q plots and histograms. Substantial deviations from normality were detected and as such, a Friedman's test was selected. Prior to conducting the Friedman's test, the data were examined for any violations of assumptions, including outliers or missing data, and the

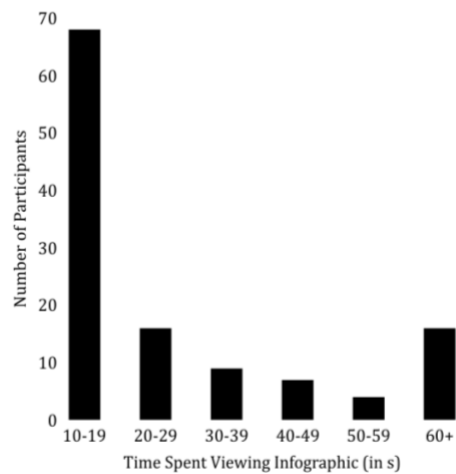
appropriate measures were taken (e.g., data imputation using expectation-maximization algorithm) to ensure robustness of the results.

## Results

### Part 1. Evaluation of Infographic Time Spent Viewing Infographic

Participants were required to view the infographic for a minimum of 10 s before they were able to move on to the remainder of the survey. On average, participants viewed the infographic for 41.21 s (Mdn = 16.15, IQR = 44.026) with a minimum time spent at 10.71 s and a maximum time spent at 656.78 s (i.e., 10 min and 57 s). See Figure 2.

**Figure 2. Bar Graph of Participants' Time Spent Viewing the Infographic.**



*Note:* A minimum time spent viewing was 10 s.

**Table 2: Questions Used to Evaluate the Infographic.**

|                                          | Question                                                                                             | Likert Scale                                                                                                                                |
|------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Visual appearance</b>                 | How satisfied are you with the visual appearance of the infographic?                                 | 1 ( <i>very dissatisfied</i> ); 2 (dissatisfied); 3 (neutral); 4 (satisfied); 5 ( <i>very satisfied</i> )                                   |
| <b>Perceived quality of content</b>      | Rate the quality of your understanding with respect to the content presented on the infographic.     | 1 ( <i>terrible</i> ); 2 (poor); 3 (average); 4 (good); 5 ( <i>excellent</i> )                                                              |
| <b>Intention to learn</b>                | Do you intend to learn more about the mental skills shown in the infographic?                        | 1 ( <i>extremely unlikely</i> ); 2 (somewhat unlikely); 3 (neither likely nor unlikely); 4 (somewhat likely); 5 ( <i>extremely likely</i> ) |
| <b>Likelihood of sharing</b>             | How likely would you be to share this infographic with someone else?                                 | 1 ( <i>extremely unlikely</i> ); 2 (somewhat unlikely); 3 (neither likely nor unlikely); 4 (somewhat likely); 5 ( <i>extremely likely</i> ) |
| <b>Persuasiveness of the infographic</b> | Do you intend to learn these mental skills in the same order they were presented in the infographic? | 1 ( <i>extremely unlikely</i> ); 2 (somewhat unlikely); 3 (neither likely nor unlikely); 4 (somewhat likely); 5 ( <i>extremely likely</i> ) |

### Satisfaction with Visual Appearance

On average, 71.7% of participants were satisfied with the visual appearance of the infographic ( $M = 3.89$ ,  $SD = 0.84$ ). Most participants indicated they were *satisfied* ( $n = 54$ ; 47.8%) and many indicating *very satisfied* with the visual appearance of the infographic ( $n = 27$ ; 23.9%).

### Perceived Quality of Understanding

On average, 75.5% of participants had a high self-reported quality of understanding ( $M = 4.06$ ,  $SD = 0.77$ ) regarding the content presented on the infographic. More specifically, many participants rated their perceived quality of understanding as *good* ( $n = 50$ ; 43.9%), while others indicated their quality of understanding to be *excellent* ( $n = 36$ ; 31.6%).

### Intention to Seek Additional Resources

On average, 73.8% of participants stated they were likely to seek out additional resources ( $M = 3.85$ ,  $SD = 0.87$ ) to learn more about the mental skills presented on the infographic. Most participants indicated they were *somewhat likely* ( $n = 60$ , 52.6%), while others indicated *extremely likely* ( $n = 24$ , 21.1%).

### Likelihood of Sharing

On average, 65.5% of participants indicated that they were likely to share the infographic with someone else ( $M = 3.75$ ,  $SD = 0.98$ ). More specifically, 52.3% ( $n = 58$ ) of participants indicated that they were *somewhat likely*, while 19.8% ( $n = 22$ ) indicated that they were *extremely likely* to share the infographic with someone else.

### Persuasiveness of Infographic

Participants' overall intention to learn the mental skills in the suggested order provided on the infographic was moderate, with 55.2% indicating either *somewhat likely* ( $n = 43$ ) or *extremely likely* ( $n = 20$ ) ( $M = 3.59$ ,  $SD = 0.95$ ).

### Part 2. Knowledge Retention

Participants were prompted to recall the infographic that was shown to them in the previous survey one month prior. They were then asked, "Based on the infographic titled the *Mental Skills Pathway* from Part 1 of this study, in what order were the following mental skills presented in the *Mental Skills Pathway*?", encouraging participants to recall the specific sequence of the mental skills presented on that infographic. Participants were given an alphabetized list of the six skills with a brief description of the skill to minimize confusion. A Friedman's non-parametric test was conducted to determine the mean rank order of mental skills to assess knowledge retention from the previous survey. Results determined significant differences between the participants' recalled sequence of mental skills  $N = 17$  ( $\chi^2(2) = 25.703$ ,  $p = .001$ ). The mean rank is as follows: imagery ( $M = 1.54$ ), goal setting ( $M = 3.15$ ), self-talk ( $M = 3.31$ ), emotional control ( $M = 3.92$ ), attentional control ( $M = 4.00$ ), and arousal regulation ( $M = 5.08$ ). Moreover, participants had varied responses regarding the implementation of the mental skills into their training (see Table 2). The most implemented skill was goal setting ( $n = 15$ , 88.2%) and the least implemented skill was arousal regulation ( $n = 9$ , 52.9%). However, despite intention to seek out additional resources in Part 1, all participants indicated "No" to seeking out additional resources.

**Table 2: Implementation of Mental Skills Within the Last Month.**

| Mental Skill        | Yes<br>(n) | %     | No<br>(n) | %     |
|---------------------|------------|-------|-----------|-------|
| Arousal Regulation  | 9          | 52.9% | 8         | 47.1% |
| Attentional Control | 12         | 70.6% | 4         | 23.5% |
| Emotional Control   | 10         | 58.8% | 7         | 41.2% |
| Goal Setting        | 15         | 88.2% | 2         | 11.8% |
| Imagery             | 12         | 70.6% | 4         | 23.5% |
| Self-talk           | 12         | 70.6% | 5         | 29.4% |

*Note:* Missing one participant response from imagery and one from attentional control.

### Discussion

The aim of the present study was to evaluate the impact and retention of information from an infographic designed to disseminate sport psychology content to athletes. Overall, the key findings of the study highlight both the strengths and limitations of infographics as a knowledge transfer product, offering valuable insights into its ability to communicate information effectively, alongside its impact on participants' learning intentions and knowledge retention. These findings also inform practical recommendations and areas of future research within knowledge dissemination.

### Evaluation of Infographic

Overall, it appeared participants were generally satisfied with the infographic. Over 70% of participants expressed greater satisfaction with the visual appearance of the infographic, and 75.5%

self-reported that they understood the content clearly. These findings suggest that the infographic's visual design effectively aided the translation of sport psychology information in a manner that was digestible for knowledge users. Previous research has shown that well-designed visuals improve comprehension and engagement in educational tools (Coyne et al., 2021; Ozdamli et al., 2016). As such, aligning visual aspects such as content and delivery with what is relevant and meaningful to the population, may increase the overall effectiveness of the product itself (Gould, 2016; Muir & Munroe-Chandler, 2020). There is immense value in integrating the needs of the client into the visual elements of the knowledge product (e.g., through relevant icons, images, and/or text) and is necessary when aiming for successful uptake and sustained use of the information.

The infographic's persuasiveness and impact on learning intentions were more complicated, as only 55.2% expressed a likelihood to implement these mental skills in the prescribed order. Moreover, despite 73.8% of participants in Part 1 expressing an intention to learn more information through additional resources, none of the participants sought out more information prior to the one-month follow-up. These findings have several important implications for knowledge translation within sport psychology. First, perhaps participants did not value or trust the knowledge being conveyed, thus opting to maintain their current perspective on the information being shared. From a knowledge translation perspective, this might indicate a barrier to knowledge use (Graham et al., 2006). While traditional barriers to knowledge use include time or access to resources,

these data may suggest one's attitude towards mental skills as a pivotal factor (Ajzen, 1991). Not only does it impact one's intention to act on the information provided (i.e., intention to learn in the prescribed order), but also on one's willingness to further engage in that information (i.e., seeking additional resources). Therefore, prior knowledge and readiness for behaviour change might have influenced the infographic's effectiveness or ability to motivate participants. Researchers should consider integrating behaviour change theories into the delivery of information to knowledge users. Second, while the infographic might have been clear, perhaps it did not present a compelling message for *why* participants should utilize these mental skills. This could reflect that although this infographic presented important content from a research lens (i.e., the use of PST skills), perhaps its applied implications were less relevant to participants. An important aspect of knowledge translation is identifying practical problems and tailoring content to address those needs (Graham et al., 2006). While the concept of the sequence of mental skills may be important to professionals in the field (e.g., Ely et al., 2023), athletes may not see this as useful. Thus, developing an infographic with a more targeted practical need (Gould, 2016), and placing emphasis on persuading the audience to implement the information shared, may have had a greater likelihood of promoting future adoption (Graham et al., 2006). Such as, sharing the value of mental skills for enhancing athletic performance and overall well-being (Vealey, 2024). Overall, this may suggest that while a knowledge product may be useful, it is only as beneficial as the messaging it conveys.

An important element of knowledge translation is to monitor how knowledge is used once implemented into a given population (Graham et al., 2006). Although longitudinal observation of how this knowledge will be applied in practice was beyond the scope of this research, data regarding participants' likelihood to share this information with others (e.g., coaches, teammates) are promising. With over 65% of participants stating they were likely to share with others, this suggests that infographics have a chance at mobilizing knowledge dissemination beyond those who receive content directly from a key stakeholder (e.g., researcher). Given roughly 56% of participants had not previously worked with a sport psychology professional, this sort of 'on the ground' dissemination of knowledge amongst knowledge users could be highly beneficial. With preliminary evidence suggesting infographics are an effective means of transmitting knowledge (e.g., Coyne et al., 2021; Wang et al., 2019), perhaps the ease of being readily forwarded or shared by knowledge users makes them an even greater asset to knowledge mobilization efforts than previously believed.

### **Retention**

Despite the largely favourable evaluation of the infographic, findings related to retention of knowledge over time revealed mixed results. While participants demonstrated a correct understanding of the basic (first) and advanced (subsequent) elements (see Figure 1), the specific sequence of mental skills was not consistently recalled from the original infographic. This suggests that while the infographic may be effective in conveying general content and sequential structure, the precise ordering may

require further refinement or additional reinforcement to improve retention. This finding is consistent with previous research, as participants were able to recall information from the infographic (Muir & Munroe-Chandler, 2020); however, the accuracy of their recall lacked precision to the specific sequence. This may be explained by pictorial superiority effect, as participants may have more easily remembered the visual elements, particularly the phased sequence, which was prominently depicted on the infographic (Schubbe et al., 2020; see Figure 1). These results highlight the potential strengths and limitations of using infographics for disseminating information in sport psychology. While they are highly rated in terms of user satisfaction and understanding, there is a clear need for further exploration of how to enhance retention and engagement, particularly regarding the accurate recall of detailed content. Nevertheless, the limited sample size of participants who responded to questions of retention ( $n = 17$ ) should be taken into consideration when interpreting these findings. Perhaps alternative methods should be utilized to maintain a larger sample to more accurately address the question of knowledge retention from infographics.

### ***Practical Implications***

It is important to highlight that the research team who created the infographic are not graphic designers, yet success was still had in the development and visual delivery of information through the infographic. This is encouraging, as potentially, through increased access to knowledge translation resources for mental performance consultants (MPCs) (Graham et al., 2006) and providing

graduate school training on dissemination sciences (Gould, 2016), could increase feasibility and confidence for individuals to engage in effective knowledge translation. In addition, as the results indicated that participants had a moderate intention to learn and implement the suggested sequence provided on the infographic, it encourages researchers to potentially integrate motivational theory into infographic and content design and delivery. To effectively encourage individuals to adopt a different perspective regarding information they feel confident with, more intentional, theory-based design elements may be necessary for researchers and practitioners when looking to provide visual resources to specific populations. There are many available resources (e.g., Research Impact Canada Knowledge Mobilization Modules <https://researchimpact.ca/learning/kmb-modules/>) and peer-reviewed articles (e.g., Muir & Munroe-Chandler, 2020) that provide guidance and support for knowledge dissemination and mobilization across disciplines.

### ***Limitations***

There were several limitations to this study, which should be noted. Importantly, the sample size was small, particularly with Part 2, which hinders the generalization of infographic effectiveness broadly. Moreover, despite such high interest in study participation in Part 1, only 13.9% of participants completed Part 2, which is a surprising result. Next, we cannot be sure that participants were actively looking at the infographic prior to engaging in the questionnaire. Despite the implementation of the 10-second time requirement, that does not mean that participants were engaging with the

material on the infographic during that time. However, given how the findings varied, it seems unlikely. Additionally, those developing infographics should consider utilizing more pictorial effects to display prominent information, as pictorial superiority effect provides a greater opportunity for effective recall of information (Schubbe et al., 2020). Finally, the research team developed the infographics themselves, without piloting the infographic with the target population. Acknowledging that visual components, such as preferences of reading left to right, could contribute to this study; by engaging in a pilot project, the research team could have adjusted the infographic prior to collecting the data, which may have impacted the results, specifically regarding intention to learn and retention of information.

### ***Future Directions***

Given the importance of knowledge mobilization, particularly within sport psychology, it is positive to see a genuine level of satisfaction in the use and visual components of an infographic for dissemination. However, researchers should consider adopting qualitative approaches to evaluating knowledge products. More specifically, by adopting Think Aloud protocols and semi-structured interviews to evaluate an infographic, researchers can gather detailed information surrounding an individual's opinions, perceptions, and attitudes, that could inform specific facilitators and barriers to infographic dissemination and comprehension of information across various populations. Moreover, as the infographic was shared electronically, it would be beneficial to understand whether there are perceptual differences between print and electronic

infographics, including various delivery modes, such as social media posts. Lastly, qualitative approaches to knowledge mobilization evaluation can gain insight to other knowledge translation modalities that could be useful and meet the needs of knowledge users, as their needs and interest must be at the forefront of research if scholars aim to bridge the research to practice gap.

### **Conclusions**

Infographics have been highlighted as a cost-effective, visually engaging modality for knowledge transfer from researcher to knowledge user (Coyne et al., 2021; Muir & Munroe-Chandler, 2020; Ozdamli et al., 2016). However, this study highlights the importance of not only the visual components associated with an infographic, but the value of basing the development of its content and delivery in motivational theory. As long-term engagement and willingness to learn is often grounded in individual's motivation, perceptions, and attitudes, knowledge products rooted in theories that drive behaviour change may be required to ensure sustainable engagement and substantive change in beliefs. This study adds to the literature to support the effectiveness of infographics at disseminating sport psychology resources with athlete populations. However, future studies should consider integrating motivational theories into infographic design and development, alongside increasing sample size to achieve desired generalizability.

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### **Authors' Qualifications**

The authors' qualifications are as follows: Samantha A. D'Agostino-Pinto BA, MHK, PhD(c); Frank O. Ely BKin, MKin, PhD; Melissa A. Paré BSc, MKin, PhD; Krista J. Munroe-Chandler, BA, MA, PhD.

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