

1 Running head: SUPPORT TYPE AND SUPPORT VISIBILITY

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4 Enacted support and golf-putting performance: The role of support type and support visibility

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1 Enacted support and golf-putting performance: The role of support type and support visibility

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3 Highlights

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5 1. Enacted support can have mixed effects upon novices' performance

6 2. Both the visibility and the type of enacted support are important.

7 3. Esteem support is best provided in a direct and visible manner.

8 4. Informational support is best provided in an indirect and invisible manner.

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Abstract

Objectives: This study examined whether the impact of enacted support on performance differed across type (esteem and informational) and visibility (visible and invisible) of support. It further tested whether self-efficacy mediated the enacted support-performance relationship. **Design:** A one-factor (support manipulation) between subjects experiment. **Method:** A fellow novice golfer — in reality a confederate — was scripted to randomly provide one of five support manipulations (visible informational support, invisible informational support, visible esteem support, invisible esteem support, and no support) to participants ($n = 105$). Immediately after, participants completed a self-efficacy measure and then performed a golf-putting task. **Results:** The results demonstrated that participants given visible esteem support significantly outperformed those given no support and those given invisible esteem support. Participants given invisible informational support significantly outperformed those given no support. Although non-significant, the observed mean difference and moderate effect size provided weak evidence that those in the invisible informational support condition may have performed at a higher level than those in the visible informational support condition. There was no evidence that self-efficacy could explain any of these effects. **Conclusion:** The results suggest that enacted support can benefit novices' performance and that it is crucial to consider both the type and the visibility of the support. Esteem support is particularly effective when communicated in an explicit and direct manner but informational support appears more effective when communicated in a more subtle, indirect manner.

Keywords: esteem support, informational support, visible and invisible support, performance, self-efficacy

1 Enacted support and golf-putting performance: The role of support type and support visibility
2 Consistent with quantitative research that has observed a relationship between social
3 support and a variety of beneficial sport outcomes (Freeman & Rees, 2008; Rees & Freeman,
4 2007), perhaps not surprisingly, athletes consistently cite social support as a key ingredient of
5 their success (Connaughton, Wadey, Hanton, & Jones, 2008; Fletcher & Sarkar, 2012;
6 Kristiansen & Roberts, 2010; Rees & Hardy, 2000). Indeed, such findings underpin
7 researchers' recommendations to encourage the exchange of supportive actions in
8 performance contexts (e.g., Connaughton et al., 2008). Evidence suggests, however, that such
9 acts of support are not always helpful. In fact, various studies in sport and social psychology
10 have demonstrated that the influence of supportive actions is quite variable and sometimes
11 associated with null or even negative effects on outcomes (e.g., Deelstra et al., 2003;
12 Freeman, Rees, & Hardy, 2009; Searle, Bright, & Bochner, 2001). Given these contrasting
13 findings, there is a need to better understand what makes supportive actions effective. In the
14 present study, we focused on two key factors of the support process: (a) the type of the
15 support, and (b) the visibility of the support.

16 Conceptualised as a situational factor (Barrera, 2000), researchers have used the term
17 'enacted support' to refer to the interpersonal exchanges of verbal and nonverbal supportive
18 acts between support providers and support recipients (Dunkel-Schetter & Bennett, 1990;
19 Goldsmith, 2004; Lakey 2010). These specific supportive actions can be provided —the
20 observable actions that individuals perform to help an individual (Cohen, Lakey, Tiell, &
21 Neely, 2005; Tardy, 1985), and/or received —the recipient's perception of the receipt of
22 support resources during a specific time frame (Uchino, 2009). As such, 'supportive' actions
23 may be perceived by the provider or the recipient to benefit the recipient (Shumaker &
24 Brownell, 1984) but could occur without being recognised by the provider or the recipient
25 (e.g., Cohen et al., 2005).

1 When support is enacted, one might intuitively expect it to be beneficial in helping
2 recipients cope more effectively with situational demands (Uchino, 2009)—a proposal that is
3 supported by the positive links between enacted support and self-confidence (Freeman &
4 Rees, 2008), as well as performance (e.g., Rees & Freeman; 2010). However, evidence from
5 studies in sport and social psychology suggests that enacted support can also be unhelpful
6 (e.g., Barry et al., 2009; Bolger & Amarel, 2007; Freeman, Coffee, Moll, Rees, & Sammy,
7 2014; Howland & Simpson, 2010). For example, in an intervention study in which golfers
8 were provided with support through a focused professionally-led intervention, all golfers
9 reported an increase in received support but only one golfer showed significant performance
10 improvements (Freeman et al., 2009).

11 In light of these mixed findings, it is vital to identify factors that influence the
12 effectiveness of enacted support. With recent studies (e.g., Freeman et al., 2014; Lu et al.,
13 2016) revealing unique effects for different supportive behaviours, one such factor to consider
14 is the type of support exchanged. Both the sport (e.g., Freeman et al., 2014) and social (e.g.,
15 Cutrona & Russell, 1990) psychology literature has suggested that at least four key types of
16 support can be distinguished: emotional, esteem, informational, and tangible support. Given
17 their importance across a wide range of performance domains, including sport (Rees &
18 Freeman, 2012), the present study focused on esteem support and informational support.
19 Esteem support has been defined as “bolstering a sense of competence or self-esteem”
20 through, for example, encouragement and positive reinforcement. Informational support has
21 been defined as “the provision of advice and guidance” (Cutrona & Russell, 1990, p. 322).

22 Various studies have examined the effects of these two types of support in a variety of
23 achievement contexts. Although esteem support has led to poorer performance (Baumeister,
24 Hutton, & Cairns, 1990; Tardy, 1994), it has generally been linked to a number of favourable
25 outcomes including self-confidence (e.g., Freeman et al., 2014) and performance (e.g.,

1 Deelstra et al., 2003; Searle et al., 2001; Thorsteinsson, James, & Gregg, 1998), and has been
2 widely regarded as the most effective form of support in achievement contexts (Cutrona &
3 Russell, 1990; Rees & Freeman, 2012). Indeed, various researchers have noted that receiving
4 esteem support may be beneficial because positive feedback and expressions of belief can
5 foster individuals' (a) sense of control and (b) belief in their capabilities to successfully
6 execute a specific task (i.e., their self-efficacy; Bandura, 1997). In contrast, although
7 informational support has been positively associated with performance (Tardy, 1994), it has
8 frequently had no effects upon self-confidence and performance (Freeman et al., 2014; Searle
9 et al., 2001), and worse still, detrimental effects upon self-esteem and distress (Bolger &
10 Amarel, 2007; Nadler, Fisher & Ben-Itzhak, 1983; Uno, Uchino, & Smith, 2002). Although
11 the focus of informational support may be on helping recipients to meet task demands
12 (Cutrona & Russell, 1990; Shrout et al., 2006), its receipt may in fact undermine an
13 individual's sense of control and evoke/reinforce feelings of incompetence and inefficacy by
14 communicating one's inability to deal with a certain stressor/situation (Shrout et al., 2006;
15 Trobst, 2000).

16 The majority of self-report or experimental studies examining the effects of enacted
17 support have focused on supportive actions recognised by the recipient. Bolger and
18 colleagues (2000) argued that it is particularly these direct, explicit or 'visible' acts of support
19 that risk increasing a recipient's sense of incompetence and inefficacy. They suggested that
20 support acts that are accomplished without being visible to the recipient, so called 'invisible
21 support', might avoid these potential costs (Bolger et al., 2000). According to Bolger and
22 colleagues (2000), there are two ways in which supportive acts can be invisible. First, acts of
23 support may occur completely outside of the recipient's awareness. Second, invisible support
24 may involve a provider purposely communicating support in such a skilful and indirect
25 manner that, although a recipient may be aware of the communication, he/she does not

1 consider it to be *support*. Because the recipient does not interpret the act as support, it may
2 minimise the negative psychological reactions associated with receiving direct, explicit
3 support. For example, a golfer (provider) may give a fellow golfer (recipient) putting advice
4 (visible support). Although intended to help, the advice could undermine the fellow golfer's
5 sense of competence and efficacy, thereby negating the potential benefits of the advice.
6 When the golfer (the provider) conveys the same point to the recipient but as an idea that all
7 golfers should consider, the costs associated with the direct provision of the advice may be
8 avoided and the advice may be more effective.

9 A number of studies have examined the influence of support visibility in performance
10 domains (e.g., Bolger & Amarel, 2007; Bolger et al., 2000; Shrout et al., 2010). For example,
11 in a daily diary study, Bolger and colleagues (2000) found that partner support in the week
12 leading up to an acute stressor (an important exam) was beneficial for the examinees'
13 emotional responses (e.g., depressed mood and anxiety) on days when partners reported
14 providing support but examinees did not acknowledge receiving support (invisible support).
15 Other studies have examined how support visibility influenced emotional and physiological
16 responses to delivering a speech in a laboratory setting (Bolger & Amarel, 2007; Kirsch &
17 Lehman, 2015). For example, in three separate experiments, Bolger and Amarel (2007)
18 examined the influence of visible and invisible support on the emotional reactivity of students
19 prior to a speech task. Visibility of support was especially important when informational
20 support was provided: Invisible informational support reduced emotional reactivity (relative
21 to visible and no support), but visible informational support was either ineffective or led to
22 increased emotional reactivity. Bolger and Amarel (2007) found that these divergent effects
23 of invisible and visible information support on emotional reactivity were mediated by the
24 recipients' self-efficacy. That is, participants receiving visible informational support felt less
25 efficacious and in turn more distressed than those receiving no support. Those receiving

1 invisible informational support felt more efficacious and subsequently less distressed than
2 those in the no support condition. Bolger and Amarel (2007) also examined the effects of
3 visibility upon emotional support (with their emotional support manipulation also including
4 elements of esteem support). Although invisibly providing emotional support seemed most
5 effective for lowering distress levels, its effects were far less distinct, with no distress
6 differences emerging between the invisible emotional support and the no support condition.
7 Furthermore, participants' distress levels in the visible emotional support condition did not
8 differ from those in the no support condition. Bolger and Amarel (2007) did not examine
9 whether invisible emotional support would benefit self-efficacy. In a laboratory based study
10 which observed support interactions between couples discussing a personal goal, Howland
11 and Simpson (2010) found no benefits of invisibly provided emotional support (including
12 "positive feedback", p.1881) in relation to recipients' self-efficacy whereas it did improve
13 recipient's mood.

14 These findings support the idea that invisible support may be superior to visible
15 support in reducing emotional and physiological responses immediately prior to a
16 performance task and that it may be particularly important for informational support.
17 Furthermore, they provide initial evidence for the mediating role of self-efficacy in explaining
18 the effects of informational support. However, we are not aware of any study to date that has
19 examined the effects of invisible support on objective task performance — the most important
20 outcome in a sports context. Further, no studies have (a) explicitly examined the effect of
21 support visibility on esteem support; (b) the effects of both esteem and informational support
22 and support visibility in the same study or (c) tested self-efficacy as a potential mediator for
23 these effects.

24 The aim of the current study, therefore, was to examine how the impact of enacted
25 support on performance differed across type (esteem and informational) and visibility (visible

1 and invisible) of support. A secondary aim was to examine whether self-efficacy could
2 explain any differential effects of support type and support visibility upon performance. To
3 achieve this, we developed an experimental paradigm which involved the manipulation of
4 support immediately prior to novices performing a golf-putting task. We made the following
5 key hypotheses: First, based upon the existing findings from the sport psychology literature
6 (e.g., Rees & Freeman, 2010), we predicted that visible esteem support would be more
7 effective for performance on the golf-putting task than receiving no support. We further
8 predicted that these performance effects could be explained by the positive impact of esteem
9 support upon recipients' self-efficacy levels. Given the mixed findings for invisible
10 emotional support (Bolger & Amarel, 2007; Howland & Simpson, 2010) and the lack of
11 research on how invisibility influences esteem support, no specific predictions were made as
12 to how invisible esteem support would influence self-efficacy and performance. Second,
13 based on the support visibility literature (e.g., Bolger & Amarel, 2007), we predicted that
14 invisible informational support would lead to better performance than receiving no support
15 and visible informational support. We further predicted that these performance effects could
16 be explained by the efficacy benefits of invisibly providing informational support. Given the
17 mixed effects of visible informational support upon performance (Searle et al., 2001; Tardy,
18 1994), we were uncertain as to whether performance differences would emerge between no
19 support and visible informational support even though we predicted that receiving (visible)
20 informational support would negatively influence self-efficacy levels.

21 **Methods**

22 **Participants and Design**

23 A convenience sample of 105 undergraduate students (female, $n = 62$; male, $n = 43$;
24 $M_{age} = 19.77$ years, $SD = 1.40$ years) was recruited for the study. All participants were right-
25 handed and only those who rated themselves on a pre-entry self-report measure as having no

1 experience or very little experience in golf-putting were included (this was an inclusion
2 criteria on the information sheet). Their golf experience was further confirmed with a
3 question on the demographics form. All participants met the inclusion criteria. This study
4 used a between-subjects experimental design with participants randomly assigned to one of
5 five support conditions (per condition, $n = 21$: visible informational support; invisible
6 informational support; visible esteem support; invisible esteem support; no support).¹ The
7 sample size was based on an a priori power analysis (G-power version 3.1; Faul, Erdfelder,
8 Lang, & Buchner, 2007). An expected effect size ($f = 0.35$) was derived from previous
9 research (Bolger & Amarel, 2007; Rees & Freeman, 2010) and entered along with power at
10 0.80 and an alpha of .05. This indicated a sample size of 105, with a minimum of 21
11 participants in each of the five experimental conditions was required.

12 **Procedure**

13 The study was approved by the institutional ethics committee. Participants signed up
14 for an experimental study lasting approximately 20 minutes with the purpose of: “examining
15 the effects of thoughts and feelings upon a golf-putting task”. Participants arrived
16 individually at the laboratory and were welcomed in a waiting area by the 26 year old male
17 experimenter. Participants provided written consent after which the experimenter gave an
18 overview of the task. The experimenter further explained to participants that, due to timing
19 issues, another participant was still completing the task in the testing area. In reality, this
20 participant was the 21 year old male confederate who was unfamiliar to the participants. To
21 ensure that participants perceived our confederate as a fellow participant, the confederate was
22 dressed in a casual fashion. The experimenter was more formally dressed. Throughout the
23 experiment, the roles of the experimenter and the confederate were fully scripted to ensure
24 standardisation across interactions and participants, and to prevent uncontrolled interactions

1 with participants. The experimenters and confederate were also trained to ensure the support
2 was provided in a natural manner.

3 The experimenter asked participants to remain seated in the waiting area and to
4 complete a demographics form so that the experimenter could finish the experiment with the
5 confederate. Shortly after participants had completed the form, they were invited into the
6 testing area, where they were informed that the confederate — seated close to where the
7 experimenter walked to with the participant — was in the process of completing a final
8 measure. Although the experimenter pointed out the presence of the confederate to the
9 participants, he continued explaining the task to avoid any unwanted interactions between
10 them.

11 The experimenter informed participants that the golf-putting task would consist of
12 performing 10 putts towards the target and their performance would be determined by the
13 average distance away from the target. A competitive situation was created by telling
14 participants that: (a) the five best performers would win prize money; and (b) their
15 performance would be displayed on a leader board, which would be visible throughout the
16 study and circulated to all participants after the study was completed (e.g., Cooke, Kavussanu,
17 McIntyre, & Ring, 2010). In reality, the leader board consisted of 20 false scores ($M = 47.50$
18 cm, $SD = 22.14$ cm; range = 12.70 – 87.30 cm).

19 As scripted, immediately after the experimenter had finished these instructions, the
20 confederate signalled that he had completed the final measure. The experimenter thanked the
21 confederate for his participation and asked whether he had any questions. The confederate
22 responded with one of the five support manipulations (described below). Following the
23 support manipulation, the confederate was thanked for his participation and left the testing
24 area. Immediately thereafter, participants completed a measure of self-efficacy before
25 performing the task.

1 For the golf-putting task, participants used a standard golf putter to putt 10 standard
2 white golf balls to a white circular target measuring 10.8 cm in diameter from a distance of
3 3m. The task was performed on a rectangular artificial putting green (5.80 m long and 2.34 m
4 wide). Following the task, participants completed a manipulation check and were thanked for
5 their participation. In addition, participants were invited to ask questions and asked whether
6 they had felt any suspicion during the experiment particularly with respect to the presence of
7 the fellow participant (none of the participants stated anything suspicious) and fully debriefed
8 regarding the real purpose of the study.

9 **Support manipulation.** The support behaviours were designed to appear credible
10 and appropriate given the confederate's role as a fellow participant. As noted previously, the
11 support manipulation occurred after the experimenter had finished the task instruction and the
12 confederate signalled that he had completed his final measure. At this point, the confederate
13 stood up from his chair, and positioned himself in close proximity of the participant and the
14 experimenter to gain their attention. The experimenter then addressed the confederate and
15 said: "Thank you for your time and your willingness to take part in this experiment. Before
16 'we' move on (at that point the experimenter would move his posture to face the participant as
17 an attempt to engage the participant), do you have any questions or anything else to say before
18 leaving the room?"

19 Table 1 shows the scripts for the confederate's replies. The support type was
20 manipulated through changing the content of the supportive message. The esteem support
21 message was based on Cutrona and Russell's (1990) definition of esteem support and
22 previous support manipulations incorporating elements of esteem support (Bolger & Amarel,
23 2007; Rees & Freeman, 2010). Similarly, consistent with Cutrona and Russell's definition,
24 the informational support message conveyed advice; specifically, a simplified message
25 adapted from previous research that found focusing on 'where you want to aim' benefits

1 putting performance (e.g., Lohse, Wulf, & Lewthwaite, 2012). Support visibility was
2 manipulated utilising the same approach as Bolger and Amarel (2007). That is, in the visible
3 conditions, the confederate addressed the informational (advice) or esteem (encouragement)
4 support directly to the participant such that it would be interpreted as a supportive act
5 (visible). In the invisible support conditions, the confederate addressed the same support
6 messages indirectly as a comment to the experimenter so that it would be helpful to the
7 participant but not perceived as support (invisible).

8 To reduce the possibility of bias, the confederate (who was blind to the experimental
9 hypotheses) remained blind to the experimental condition until immediately prior to signalling
10 to the experimenter that he had completed the final measure. At this point, the confederate
11 finished his final questionnaire and turned the sheet to find out which condition to implement.
12 The experimenter remained blind to the experimental condition until the support manipulation
13 was conveyed to the participant.

14 **Measures**

15 **Self-Efficacy.** Self-efficacy was assessed with a putting-specific questionnaire
16 developed for this study following Bandura's recommendations (1997). The questionnaire
17 listed 10 bands, which corresponded to 10 cm wide bands on a metre ruler placed on the
18 artificial green projecting from the centre of the target. For each band, participants indicated
19 their belief they could achieve an average score equal to or better than the band (*yes/no*). For
20 each affirmed band, they rated the degree of confidence (*0-100%*) of getting their average putt
21 equal to or better than that band. Scores for self-efficacy were determined by adding up the
22 total confidence scores and dividing the scores by the total number of levels (i.e., 10).

23 **Performance.** Putting performance was assessed by the mean radial error (the
24 average distance a ball finished from the target in centimetres) of the 10 putts (Mullen &

1 Hardy, 2000). For putts that finished on the centre of the target, zero was recorded and used
2 in the computation of the mean radial error.

3 **Manipulation check.** After performing the golf-putting task, participants completed a
4 manipulation check. Similar to Bolger and Amarel (2007), the manipulation check for
5 informational support was the item: “The other student offered me advice or guidance
6 (*yes/no*)”. The manipulation check for esteem support was the item: “The other student
7 encouraged me to do well (*yes/no*)”. These items were embedded in a final 17-item
8 questionnaire. In line with the *purpose* of the study, the remaining items asked participants
9 about their thoughts and feelings prior to the golf-putting task (e.g., “I thought about my
10 putting stroke”).

11 **Data Analysis**

12 To examine whether self-efficacy and performance differed across support conditions,
13 two one-way between-groups analyses of variance were conducted with Tukey HSD post-hoc
14 tests. Effect sizes were calculated using partial eta squared for the omnibus F-tests and
15 Cohen’s *d* for the post-hoc analyses. To determine whether any between-group differences in
16 performance were mediated by self-efficacy, analyses were conducted using the *MEDIATE*
17 *SPSS* custom dialog (Hayes & Preacher, 2014). This custom dialog tests the total, direct, and
18 indirect effect of an independent variable on a dependent variable through a proposed
19 mediator and allows inferences regarding indirect effects using percentile bootstrap
20 confidence intervals. In the present study, the independent variable (support manipulation)
21 was multi-categorical (the five support conditions). Hayes and Preacher (2014) have
22 developed an indicator coding method (also referred to as dummy coding) to analyse indirect
23 and direct effects involving a multi-categorical variable. Actually, the indirect effect is
24 *relative* because the indirect effect is quantified by the effect of being in one condition relative
25 to another condition. Using *MEDIATE*, we first set the ‘no support’ condition as the

1 reference group to examine the indirect effects of each support condition relative to the ‘no
2 support’ condition on performance through self-efficacy. We further tested the *relative*
3 indirect effects using visible informational support and visible esteem support as the reference
4 groups.

5 **Results**

6 **Manipulation Check**

7 In the visible informational support condition, 18/21 participants reported receiving
8 advice while 18/21 reported receiving encouragement from the fellow participant. In the
9 invisible informational support condition, 3/21 reported receiving advice and 5/21 reported
10 receiving encouragement. In the visible esteem support condition, 18/21 participants reported
11 receiving encouragement from the fellow participant while 12/21 reported receiving advice.
12 In the invisible esteem support condition, 1/21 reported receiving encouragement and 0/21
13 reported receiving advice. These results suggest that the manipulations were largely
14 successful, as participants rarely reported the receipt of support in both invisible support
15 conditions and almost always reported the receipt of support in the visible support conditions.
16 It should be noted, however, that many participants reported receiving encouragement in the
17 visible informational support condition and some participants reported receiving advice in the
18 visible esteem support condition (see Discussion for more on this point).

19 **Performance**

20 Means, standard deviations, and 95% confidence intervals of putting performance
21 (mean radial error) as a function of the five support conditions are displayed in Table 2. Data
22 met the assumption of normality. A Levene’s test demonstrated that the variances for putting
23 performance were not equal for the different support conditions ($F_{4,100} = 3.12, p = .02$).
24 However, given that group sizes were equal, we conducted the one-way independent ANOVA
25 without corrections (Field, 2009). There were significant differences in performance between

1 the support conditions ($F_{4,100} = 7.25, p < .001, \eta_p^2 = .23$). Tukey's HSD pairwise
2 comparisons revealed that participants given visible esteem support performed significantly
3 better than those given no support ($p = .01, d = .97$) and those given invisible esteem support
4 ($p = .001, d = 1.17$). No significant performance differences emerged between participants
5 given invisible esteem support and those given no support ($p = .92, d = .21$). Participants
6 given invisible informational support performed significantly better than those given no
7 support ($p = .01, d = 1.02$) but not significantly better than those given visible informational
8 support ($p = .70, d = .50$). No significant performance differences emerged between
9 participants given visible informational support and those given no support ($p = .25, d = .64$)
10 or visible esteem support ($p = .73, d = .46$). In addition, participants given invisible
11 informational support and visible informational support performed significantly better than
12 those given invisible esteem support ($p = .001, d = 1.21; p = .04, d = .85$). No significant
13 performance difference emerged between participants given visible esteem support and those
14 given invisible informational support ($p = 1.00, d = .02$). All the significant differences
15 between the conditions correspond to large effect sizes (Cohen, 1988).^{2,3}

16 **Self-Efficacy**

17 Three participants did not complete the self-efficacy measure correctly and were
18 therefore excluded from analysis. Means, standard deviations and 95% confidence intervals
19 of self-efficacy as a function of the five support conditions are displayed in Table 2.
20 Assumptions of normality and homogeneity of variances were met ($p > .05$). The one-way
21 ANOVA revealed no significant differences in self-efficacy between any of the support
22 conditions ($F_{4,97} = 2.34, p = .07, \eta_p^2 = .09$).^{2,3}

23 **Mediation Analyses**

24 To estimate the significance of the indirect effects, we used percentile bootstrap
25 confidence intervals (based on 5000 samples). In contrast with the steps outlined by Baron

1 and Kenny (1986) to establish mediation that (a) the independent variable must affect the
2 mediator (path *a*); (b) the independent variable must affect the dependent variable (path *c*);
3 and (c) the mediator must affect the dependent variable (path *b*), recent recommendations
4 (Hayes, 2013; Zhao, Lynch Jr., & Chen, 2010) suggest that the only requirement for
5 mediation is a significant indirect effect, $a \times b$, “even if either *a* or *b* (or both) are not
6 statistically significant” (Hayes, 2013, p.168). Therefore, even though the experimental
7 manipulation did not lead to significant differences between conditions for self-efficacy, we
8 still performed mediation analyses for self-efficacy. For all mediators, homogeneity of
9 regression slopes was met ($p > .05$). Using indicator coding with the no support group as the
10 reference, there was no significant relative indirect effect for self-efficacy, because each 95%
11 confidence interval contained zero (absolute effect sizes ranged from .09, 95% CI [-1.23,
12 1.70] to 1.73, 95% CI [-5.34, .49]).⁴

13 Discussion

14 The aim of the present study was to examine how the provision of visible or invisible
15 esteem and informational support influenced the performance of novices on a golf-putting
16 task. The results were largely in line with our hypotheses, with visible esteem support and
17 invisible informational support appearing particularly beneficial for performance. That is, as
18 predicted, participants given visible esteem support significantly outperformed those given no
19 support (as well as those given invisible esteem support); participants given invisible
20 informational support significantly outperformed those given no support. Despite the
21 statistically non-significant difference between the invisible and visible informational support
22 conditions, the associated mean difference and moderate effect size suggest that the direction
23 of effect may be in favour of the invisible informational support condition performing at a
24 higher level. Given the relatively small sample size, however, this result would benefit from
25 further testing. Although again non-significant, the mean difference and moderate effect size

1 suggest that visible informational support may have been beneficial compared to no support
2 (and was at worst no different from no support). With the observed means for invisible
3 esteem support and no support being approximately equal (and with a corresponding small
4 effect size), invisibly providing esteem support seemed ineffective. There were no
5 differences in self-efficacy between any of the support conditions, and self-efficacy could not
6 explain the performance differences observed between the support conditions.

7 In line with previous work (e.g., Rees & Freeman, 2010), the findings provide further
8 evidence that the provision of visible esteem support can have an immediate beneficial effect
9 upon performance. There was evidence that invisibility worsened the effectiveness of esteem
10 support. That is, invisible esteem support led to poorer performance relative to visible esteem
11 support and was no different from no support. These findings clearly contradict Bolger and
12 Amarel's (2007) notion that invisibility maximises the benefits of provided support but
13 complement and extend other recent work suggesting that invisibility may not necessarily
14 enhance the effectiveness of esteem support across both acute (Biehle & Mickelson, 2012;
15 Priem & Solomon, 2015) and chronic stressors (Vilchinsky et al., 2011). One possible
16 explanation is that in an attempt to reduce the costs — feelings of incompetence and
17 inefficacy — associated with receiving support (e.g., Bolger & Amarel, 2007), invisibility
18 may have simply obscured the purpose of esteem support — to bolster an individual's sense
19 of competence (Cutrona & Russell, 1990). Considering the novelty of the performance task,
20 the golfers may indeed have preferred explicit (visible) provision of esteem support. This
21 aligns with Girme and colleagues' (Girme, Overall, & Simpson, 2013) findings that their
22 visible 'emotional' support (which included esteem support elements) was only helpful for
23 those recipients who were distressed. It should be noted, however, that although Girme and
24 colleagues showed that invisible emotional support was not immediately beneficial, it did

1 appear to facilitate goal achievement over time. Future performance-based research might
2 therefore take into account both short- and long-term effects of support visibility.

3 Consistent with our hypotheses, invisible informational support appeared particularly
4 important for performance. This finding is in line with the theorising of Bolger and Amarel
5 (2007) and adds to the existing body of research revealing the benefits of invisibly providing
6 informational support in relation to a variety of outcomes (Bolger & Amarel, 2007; Howland
7 & Simpson, 2010; Kirsch & Lehmann, 2015). For example, Bolger and Amarel (2007) found
8 that invisible informational support reduced emotional reactivity prior to a performance task.
9 The findings of the present study move beyond this research in that they provide the first
10 experimental evidence that invisibly providing informational support can benefit actual
11 performance.

12 Interestingly, although non-significant, the moderate effect size suggests that visible
13 informational support was likely better (and certainly not worse) for performance than no
14 support. This differs from previous studies (Bolger & Amarel, 2007; Howland & Simpson,
15 2010) that demonstrate the negative effects of visible informational support upon
16 psychological states such as negative affect and distress. Whereas those previous studies used
17 acute stressors (i.e., a speech task, Bolger & Amarel, 2007; setting a personal goal, Howland
18 & Simpson, 2010), over which participants may have perceived a high level of control, we
19 used a novel performance task (golf-putting) over which participants may have perceived
20 relatively little control. As such, in the current study, participants may have felt less
21 undermined in their sense of competence and control when receiving visible informational
22 support. Furthermore, although unintended, many participants who were given visible
23 informational support reported the receipt of both advice and encouragement. Indeed,
24 researchers have noted that supportive actions may sometimes serve multiple functions
25 (Cutrona & Russell, 1990; Goldsmith, 2004). For example, individuals can perceive

1 messages of advice as an expression of care and/or encouragement (Goldsmith, McDermott,
2 & Alexander, 2000). In the current study, then, the perception of visible informational
3 support as not only advice but also encouragement may, in turn, have limited its potential
4 undermining effect. This might also explain why visible informational support appeared
5 (albeit non-significantly so) to be 'better' than no support. Notwithstanding these speculative
6 comments, both the significant performance difference between those in the invisible
7 informational support condition and those in the no support condition, combined with the
8 observed higher performance level of those receiving invisible informational support
9 compared to those receiving visible informational support, suggest that any potential benefits
10 of informational support may indeed have been hindered by its visible provision.

11 Given the suggested importance of self-referent judgments of competence and efficacy
12 in mediating the effects of support (e.g., Bolger & Amarel, 2007; Newsom, 1999), we tested
13 whether self-efficacy mediated the effects of the experimental manipulation on performance.
14 No differences emerged in participants' self-efficacy beliefs as a result of the support
15 manipulations and there was no evidence to suggest that self-efficacy could explain why
16 visible esteem support and invisible informational support were most beneficial for
17 performance. One possible explanation is that it may have been difficult for novice
18 participants to judge their self-efficacy beliefs because of a lack of task-specific knowledge
19 (Feltz, Short, & Sullivan, 2008), reducing the predictive strength of self-efficacy on putting
20 performance. Further, exploring just one mediator may not have captured the complexity
21 through which the support manipulations influenced performance (Uchino et al., 2012). The
22 enactment of support may lead to a host of cognitive and emotional states (e.g., perceived
23 control, anxiety), which in turn lead to differential outcomes. Future research should include
24 multiple mediators (Uchino et al., 2012) to try to disentangle the psychological mechanisms
25 underpinning the observed effects.

1 Taken together, the findings add to the existing research by highlighting the need to
2 consider the type of support when examining the effects of enacted support upon outcomes
3 (Freeman et al., 2014). Many studies examining the effects of enacted support have used
4 aggregate measures (e.g., Freeman & Rees, 2008; Howland & Simpson, 2010) or manipulated
5 a combination of support behaviours (Rees & Freeman, 2010). The present research focused
6 on a specific type of support in each manipulation, allowing us to establish the differential
7 effects of esteem support and informational support on performance.

8 The present findings advance the social support literature in understanding the
9 influence of visibility upon the effectiveness of enacted support in performance situations.
10 Whereas researchers (e.g., Bolger & Amarel, 2007; Bolger et al., 2000; Howland & Simpson,
11 2010) have argued that invisibility would maximise the benefits of provided support
12 regardless of the type of support, the present findings emphasise that support visibility and
13 support type should be considered in combination. This is consistent with recent research
14 revealing the benefits of invisibly provided informational support upon psychological distress,
15 self-efficacy, and physiological stress reactivity (Bolger & Amarel, 2007; Kirsch & Lehman,
16 2015) but no effects for invisible emotional support upon physiological stress recovery (Priem
17 & Solomon, 2015). Broadening our understanding of how support visibility and support type
18 influence other outcomes in performance situations is an important avenue for future research.

19 As a whole, the strong performance effects for both visible esteem support and
20 invisible informational support suggest the need for a caveat to the suggestion that esteem
21 support is the most effective type of support in achievement contexts (Cutrona & Russell,
22 1990; Rees & Freeman, 2012). The present study along with other experimental studies
23 (Bolger & Amarel, 2007) and field observations (Shrout et al., 2010) demonstrates that
24 informational support can be equally as effective as esteem support, but that providers should
25 be educated as to how best to provide it. For the provision of esteem support, support

1 providers such as coaches and fellow athletes should attempt to give esteem support —e.g.,
2 positive feedback and encouragement— that is explicit and clearly directed to the recipient.
3 For the provision of informational support, it is important that providers are aware of indirect
4 ways to impart task-related knowledge and/or strategies. For example, based on the current
5 study, athletes could help a fellow athlete who is experiencing difficulties with a certain task
6 by expressing their own problems with the task and their way of overcoming it rather than
7 directly addressing the other's difficulties. Alternatively, athletes could aid the struggling
8 fellow athlete by asking for advice from the coach on the task, covertly helping the fellow
9 athlete. Furthermore, coaches and fellow athletes could indirectly communicate advice by
10 telling a story about their own or other more prominent athletes' experiences (Goldsmith,
11 2004). By conveying knowledge and strategies in this indirect manner, individuals are able to
12 provide advice without undermining athletes' sense of autonomy, control and competence.

13 Against the backdrop of the performance effects in the present research, several
14 limitations have to be acknowledged. First, the experimenter was aware of the study
15 hypotheses. To minimize any experimenter bias, the experiment was fully scripted and the
16 experimenter remained blind to the experimental condition until the confederate conveyed the
17 support manipulation to the participant (Bolger & Amarel, 2007). Second, the provision of
18 support by an unacquainted confederate in an isolated laboratory situation poses a threat to
19 ecological validity. Although the confederate was identified as a fellow participant to
20 increase similarity between the confederate and the participant, this dyadic relationship
21 remains quite different from close interpersonal relationships. Indeed, the nature of the
22 provider-recipient dyad might moderate the effectiveness of enacted support (Uchino et al.,
23 2011). For example, individuals who receive support from lower -quality relationships (i.e.,
24 strangers) may be more sensitive to the support enacted (Uchino et al., 2011) so the findings
25 of the present study may not correspond with support enacted in naturalistic settings. Third,

1 researchers have argued that providing visible informational support might be less
2 undermining and visible esteem support more pressuring when enacted by individuals with
3 more expertise (Cutrona & Suhr, 1992; Rosenfeld et al., 1989). Accordingly, future studies
4 could test the role of support visibility and support type in existing dyadic relationships across
5 a range of providers (i.e., coaches, teammates), ideally, in real world performance contexts.
6 This would not only enhance external validity but also further explore the applicability of
7 invisible (informational) support in sporting contexts. Finally, as suggested by Schweizer and
8 Furley (2016), we based the sample size of our experiment on observed effect sizes from
9 existing studies (Bolger & Amarel, 2007; Rees & Freeman, 2010). However, we
10 acknowledge that the current experiment's power was insufficient to detect small- to
11 moderate-sized effects and that smaller sample sizes may have an increased likelihood of
12 producing a false-positive (Schweizer & Furley, 2016). Therefore, future studies are needed
13 to demonstrate the reproducibility of our findings.

14 In conclusion, the findings of the present study suggest that the provision of support
15 can facilitate performance, but it is vital to consider the type and visibility of support. The
16 findings add to the existing literature by demonstrating that visible esteem support can have
17 immediate and direct effects upon performance. The findings are unique in that they show
18 that informational support can also be beneficial for performance and appears most effective
19 when provided in a subtle, indirect, and invisible manner. Consistent with Connaughton and
20 colleagues (2008), we encourage the provision of support in performance contexts but
21 emphasise that support providers should consider the content of support and the manner of its
22 provision.

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1 Footnotes

2 ¹ A Chi-square test revealed a similar number of males and females across conditions
3 ($\chi^2 [4, n = 105] = .63, p = .96$).

4 ² Researchers have argued that gender might moderate the effects of provided support
5 (e.g., Uchino, 2009). When factoring in a between-group independent variable ‘gender’
6 (males/females), a two-way between-subjects ANOVA on performance revealed a main effect
7 of provided support upon performance ($F_{4, 95} = 6.92, p < .001, \eta_p^2 = .23$) with the same
8 pattern of results across conditions as in the original analyses. There was a main effect for
9 gender ($F_{1, 95} = 18.93, p < .001, \eta_p^2 = .17$) with male participants generally performing better
10 on the golf putting task than female participants but no interaction effect ($F_{4, 95} = .158, p =$
11 $.959, \eta_p^2 = .01$), ruling out gender as a potential confounder in this study. For self-efficacy, the
12 two-way between-subjects ANOVA revealed no main effects for provided support ($F_{4, 91} =$
13 $2.28, p = .07, \eta_p^2 = .09$), again similar to the original analyses. There was a main effect for
14 gender ($F_{1, 91} = 7.36, p = .008, \eta_p^2 = .08$) with male participants feeling more efficacious prior
15 to the golf-putting task than female participants but no interaction effect ($F_{4, 91} = .67, p = .61,$
16 $\eta_p^2 = .03$).

17 ³ Although the support manipulations were largely successful, some participants
18 reported the receipt of support in the invisible conditions and receiving no support in the
19 visible support conditions. Removing these participants revealed nearly identical results for
20 the effects of provided support upon performance ($F_{4, 86} = 6.76, p < .001, \eta_p^2 = .24$). Again
21 participants given esteem visible support and informational invisible support outperformed
22 those given no support and esteem invisible support (all $p < .01$). Also, for self-efficacy,
23 identical results were observed ($F_{4, 86} = 2.11, p = .09, \eta_p^2 = .09$). We therefore used the full
24 sample in the reported analyses.

- 1 ⁴ Similar results were obtained with informational visible support and esteem visible
- 2 support as the reference group.

Table 1

Support Manipulations per Condition

Condition	Peer response
Visible informational support	“No not really. But, can I say something to the participant? The task was okay, really. But to do well I would say make sure that you relax, take your time, and focus on the target.”
Invisible informational support	“No not really. The task was okay, really. As long as everyone relaxes, takes their time, and focuses on the target, they can do well.”
Visible esteem support	“No not really. But can I say something to the participant? The task was okay, really. I think that you will be able to do fine on this task. Really, you have nothing to worry about. I am sure you can do well”
Invisible esteem support	“No not really. The task was okay. I think that everyone will do fine on this task. Really there is nothing to worry about. I’m sure everyone can do well.”
No support	“No not really.”

Table 2

Means, Standard Deviations, and 95% Confidence Intervals of Putting Performance (cm) and Self-Efficacy per Support Condition

Condition	Performance			Self-efficacy	
	<i>M (SD)</i>	95% CI		<i>M (SD)</i>	95% CI
Visible informational support	56.21 ^a (13.38)	[50.12 – 62.30]		40.10 (13.24)	[33.90 – 46.29]
Invisible informational support	49.28 ^{b,d} (14.34)	[42.76 – 55.81]		46.12 (16.27)	[38.02 – 54.21]
Visible esteem support	49.55 ^{c,e} (15.57)	[42.46 – 56.64]		53.62 (16.21)	[46.24 – 61.00]
Invisible esteem support	71.73 ^{a,b,c} (21.93)	[61.74 – 81.71]		52.87 (20.15)	[43.69 – 62.04]
No support	67.20 ^{d,e} (20.36)	[57.93 – 76.46]		44.69 (18.61)	[36.22 – 53.16]

^{a,b,c,d,e} Means with similar superscripts are significantly different from one another (based on the Tukey HSD test) at the $p < .05$ level.