Adapting Emotional Support to Personality for Carers Experiencing Stress

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Abstract. Carers - people who provide regular support for a friend or relative who could not manage without them - frequently report high levels of stress. Good emotional support (e.g. provided by an Intelligent Virtual Agent) could help relieve this stress. This study investigates whether adaptation to personality affects the amount and type of emotional support a carer is given and possible interaction effects with the stress experienced. We investigated the personality trait of Emotional Stability (ES) as it is interlinked with low tolerance for stress. Participants were presented with 7 stressful scenarios experienced by a fictitious carer and a description of their personality and asked to rank 6 emotional support messages. We predicted that people with low ES would be given more emotional support messages overall and that ES would affect the type of emotional support messages given in each scenario. We found that participants gave more praise to the high ES carer with a trend towards other support types for the low ES carer.

Keywords: Ehealth; personality; emotional support

1 Introduction

Carers - people who provide regular support for another person, without payment - save the UK economy £119 billion every year [2], but frequently report high levels of stress [22]. Good quality emotional support can relieve this stress and reduce negative affect [20]. This work is motivated by the fact that Intelligent Virtual agents that react to affect can be effective in delivering emotional support [12, 18, 20]. Studies for First responders [6] and carers [20] have found that people provide different types of emotional support to people experiencing difference types of stress. In this study we wish to expand on this to investigate whether the personality of the person experiencing stress affects the type of support they are offered and whether this interacts with the stressor experienced.

Personality describes who we are and how we react in given situations. There are many ways to measure personality. One of the most popular and reliably validated is the Five-Factor Model (FFM) [8], which describes an individual's personality on a set of scores on five different factors or traits: Extraversion (I),

Agreeableness (II), Conscientiousness (III), Emotional Stability (or Neuroticism) (IV) and Openness to Experience (V). We hypothesize that carers with different personalities may require different types and amounts of Emotional Support. In this paper, we focus on Emotional Stability. Highly emotionally stable individuals are calm, non-neurotic and imperturbable [11], while low ES individuals (those with low Emotional Stability) are more likely to worry, feel negative affective states and experience depressive symptoms [23, 14, 13], and as such may require more support to deal with these emotions.

There is evidence that people provide different types of emotional support to low ES people. [5] investigated the provision of Emotional Support for learners, and found that Low ES learners received more emotional support than emotionally stable learners. Additionally, the type of emotional support provided differed, with low ES learners receiving additional 'emotional reflection' (acknowledging how the learner is feeling) where they had performed poorly. We want to investigate whether these findings also apply to the carer domain.

The field of tailored health communication has long established the need to personalise health messages in order to improve the cognition of the message and incite behaviour change [10]. While the aim of emotional support is not to incite behaviour change per se, such personalisation is likely to also be beneficial in creating more impactful emotional support.

Conducting research with carers is difficult, owing to the fact that the people who need support most (i.e. people who care over 50 hours a week and experience social isolation) do not have the time or freedom to participate in multiple experiments. As carers do not belong to a discrete cultural group and are very common within society, we expect that the general public are capable of empathising with carers. Therefore our approach is to present members of the public with a scenario about a carer and ask what support they think the carer would like. In this way we can generate a model of the types of support that people think a carer would appreciate without taking up a carer's time. We of course will validate this model by consulting carers at a later date.

2   Study

In this study we examine the impact of high or low emotional stability on the type and quantity of emotional support messages given to a fictional carer experiencing different types of stress.

2.1   Methods

Design. We used a mixed design. As a between subject factor, each participant saw only one personality level. As within subject factors, each participant saw all 7 scenarios and 6 messages. Participants rated their empathy with the scenario (here called 'Sympathy' to disambiguate it from the message category 'Empathy'), to allow us to control for low empathy. They also ranked 6 support messages. The Independent Variables were Scenario (7 levels), Message (6) and

Personality (2); the dependent variables were Sympathy (1-7) and Message Rank (0-6, coded as First=6... Sixth=1 and unranked=0).

Materials.

– Stressful Scenarios of seven key stressors (adapted form the NASA-TLX [9] by [6]) depicting carers were taken from [20] (see Table 1).
– Two validated descriptions of a high and low ES person (with neutral other traits) were taken from [5] (see Table 2).
– Six validated emotional support messages depicting six different categories of emotional support were taken from [20] (see Table 3).

Table 1. Scenarios depicting Stressors taken from [20]

Stressor	Scenario
Interruption (IN)	James is John's carer. Today James needed to get John ready for bed, but people kept phoning him.
Isolation (IS)	James is Fred's carer. Fred spends most of the day asleep. Today James was alone all day and no home carers were scheduled to visit.
Mental Demand (MD)	James is Julia's carer. Today James had to carry out minor medical tests. The tests are not dangerous if he does them wrong but the procedure is complex and requires concentration.
Physical Demand (PD)	James is Max's carer. Today James moved heavy furniture and boxes from Max's upstairs bedroom to his new bedroom downstairs.
Temporal Demand (TD)	James is Samantha's carer. Today James had to drop Samantha off at the doctors at 4.30pm, collect her prescription from the pharmacy at the other side of town before it closed and collect some groceries before collecting her at 5pm.
Emotional Demand (ED)	James is Gary's carer. Today Gary was confused and very upset and James comforted him.
Frustration (FR)	James is Diane's carer. Today James wanted to drop Diane off at the day care center so he could have some free time, but the center was closed.

Participants. Participants were recruited from Mechanical Turk [15] and were paid $0.80. Participants had to complete an English comprehension test, have an acceptance rate of at least 90% and reside in the US. There were 61 participants (31 female). 11 were aged 18-25, 28 were 26-40 and 22 were 41-65.

Procedure. Participants were told what a carer was and that they would be shown 7 scenarios involving a carer called James. They were then shown a short

Read and follow the instructions below. Take your time - there are no right or wrong answers; we are interested in what you think.

The following scenarios depict a carer in a stressful situation. A carer is a person who provides regular support for another person (typically a friend or family member) without formal payment.

These scenarios are about a carer called James. He cares for Susan.

James often feels sad, and dislikes the way he is. He is often down in the dumps and suffers from frequent mood swings. He is often filled with doubts about things and is easily threatened. He gets stressed out easily, fearing the worst. He panics easily and worries about things. James is quite a nice person who tends to enjoy talking people and tends to do his work.

> **Scenario 1 of 7**
> **Today James wanted to drop Susan off at the day care center so he could have some free time, but the center was closed.**

Imagine you are James.
How well do you think you can empathise with the stress he is experiencing in this situation?

Very poorly= "I don't understand this situation/would not find this stressful"
Very well="I have experienced a similar situation and understand exactly how stressful it is"

| Please Select ▼ |

Imagine you are James's friend.

Below is a selection of support messages.
Rank as many messages as you think he would like to receive in this situation. Rank the most important one as Best'. the next as 'Second best' etc.
You don't need to rank all of them if you don't think James would like to receive them.

Support Message	Ranking
You are an amazing person.	Please Select ▼
Let me help you.	Please Select ▼
Your work is very appreciated.	Please Select ▼
You can do this.	Please Select ▼
Just take it one step at a time.	Please Select ▼
I understand how stressful it must be.	Please Select ▼

Please explain why you have given these rankings.

Fig. 1. Screenshot of Experiment. James the carer is introduced and a low/high ES description given. The Scenario (1/7) is followed by a) an empathy rating b) the possibility to rank as many or few out of 6 support messages.

Table 2. High and Low ES personality stories from [5]

Emotional Stability(ES)	
Low	High
James often feels sad, and dislikes the way he is. He is often down in the dumps and suffers from frequent mood swings. He is often filled with doubts about things and is easily threatened. He gets stressed out easily, fearing the worst. He panics easily and worries about things. James is quite a nice person who tends to enjoy talking people and tends to do his work.	James seldom feels sad and is comfortable with himself. He rarely gets irritated, is not easily bothered by things and he is relaxed most of the time. He is not easily frustrated and seldom gets angry with himself. He remains calm under pressure and rarely loses his composure.

Table 3. Emotional Support Messages with categories

Category	Message
Appreciated (APP)	Your work is very appreciated.
Supported (SUP)	Let me help you
Empathy (EMP)	I understand how stressful it must be
Practical Advice (PRA)	Just take it one step at a time
Encouragement (ENC)	You can do this.
Praise (PRS)	You are an amazing person

description of James' personality, either depicting high or low ES. This remained at the top of the screen for all scenarios. They were then presented with each scenario in turn, asked to rate their empathy with the carer's situation and were asked to give as many of the 6 support messages as they wished and to rank the messages they had chosen (see Figure 1).

Hypotheses.
H1 People will give different support messages to the low ES carer.
H2 People will give more support messages to the low ES carer.

2.2 Results

Effects of Scenario×Personality on Message Rankings. Figure 2 shows the mean ranks of each message for the 2 ES levels and the number of messages overall. Previous research has found that empathy with a situation affects emotional support [19, 4]. Thus in order to ensure that the empathy level did not impact our results, this was controlled for as part of our analysis. A 7×2 within-subjects ANCOVA was performed of Scenario×Personality, controlling for Sympathy, on Message rankings (6 levels). This was chosen as the most appropriate test for this data (ANCOVA is a powerful test and can be used for non-normal data) [21]. This was significant at $F(1,419)=186.50$, $p<0.01$. There were significant effects for Scenario ($F(6, 419)=3.54$, $p<0.01$) and sig-

nificant interaction effects for Message×Scenario (F(30, 2095)=11.67, p<0.01) and Message×Personality (F(5, 2095)=2.44, p<0.05).

Post-hoc tests on Scenario revealed that the Mental Demand, Physical Demand and Temporal Demand scenarios had significantly higher message rankings than Isolation, indicating that more messages were given for these scenarios. Post-hoc tests for the interaction of Message×Scenario revealed the most popular messages for each scenario, shown in Table 2.2. These results are similar to the findings in [20].

Table 4. The best ranked messages for each scenario. Significantly better than other messages at p<0.05

Scenario	Highest Ranked Messages
Mental Demand	PRA, ENC, EMP
Temporal Demand	SUP, APP, ENC, PRA
Physical Demand	SUP, APP
Frustration	SUP, EMP, APP
Interruption	SUP, EMP, ENC, APP
Isolation	APP, PRS
Emotional Demand	APP, PRS

Post-hoc tests on Personality revealed a significant effect of personality on the Praise message. Participants ranked Praise significantly higher for the high-ES carer (Mean=2.94, S.E.=0.15) than the low-ES carer (Mean=2.41, S.E.=0.15). This supports hypothesis **H1**.

Effects of Scenario×Personality on Number of Messages ranked. A 7×2 within-subjects ANCOVA was performed of Scenario×Personality, controlling for Sympathy, on Number of Messages ranked. This was significant at F(14,419)=3.59, p<0.01. There were significant effects for Scenario (F(6, 419)=2.64, p<0.05). Post-hoc tests showed that fewer messages were given for the Isolation Scenario (mean=3.75, S.E.=0.24) than for Mental Demand (mean=4.82, S.E.=0.24) and Temporal Demand (mean=4.90, S.E.=0.24). This supports findings in [20]. There was no effect of personality, contrary to **H2**.

These results suggest that there is some variability in the type of emotional support that people give to carers with high and low ES. The low ES carer received less Praise; however, there was no significant difference of the number of messages ranked for each personality. This implies that the low ES carer must have received more of another type of support. From Figure 2 we can see that the low ES carer received more Empathy, Practical Advice and Encouragement than the high ES carer. Although not significant, it may be that the low ES carer received a mixture of these three support types instead of Praise and this has diluted any effect, as rankings were split between them.
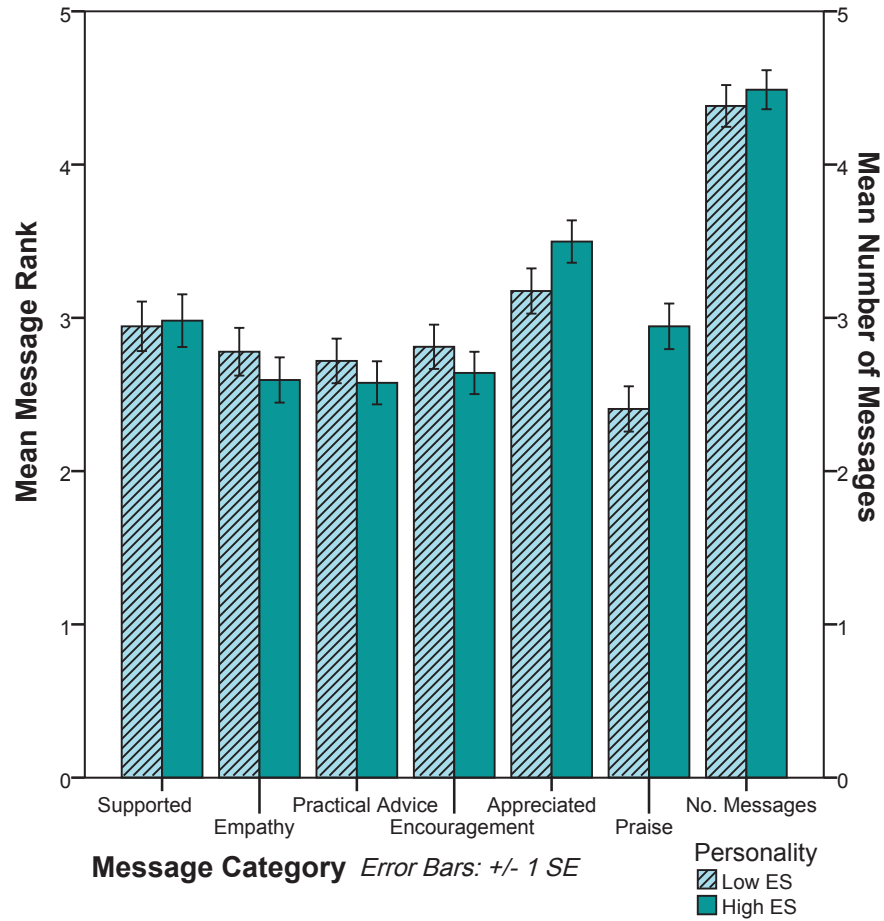
Fig. 2. Mean rank of messages and mean no. messages for ES High and Low

3   Discussion

We found that the High emotionally stable carer was given more Praise than the low ES carer. The data also suggests that low ES carers receive a wider range of emotional support. This might be because neurotic individuals are more worried about failing a task [7] and so are not praised but reassured with empathy, encouraged and given advice. The High ES carer isn't given as wide a variety of support as they aren't perceived as needing it. Encouragement has an advantage over Praise in that it can be delivered when things are going badly, while Praise is appropriate only when someone has performed well in a task - thus encouragement could be seen as a better motivator [17] and so was provided to the low ES carer.

It is of course hard to tell why participants picked certain messages over others for the carer as we did not obtain useful qualitative data about their choices. It is possible that the changing scenarios became more salient to the participants than the personality description and that they neglected to consider personality when they were picking messages. Identifying participants with high and low ES and investigating which messages they pick for the carer would perhaps yield clearer results.

This study uses Mechanical Turk. This is a useful tool for crowd-sourcing a large number of diverse participants (vs typical university student samples). Furthermore, data obtained from Mechanical Turk has been found to be high quality and reliable [3]. 36% of our participants were aged 41-65; in England and Wales, people aged 50-64 are most likely to be carers [1]. By examining our demographic data about our participants, 20 out of 61 reported to be informal carers, while a further 25 claimed to be professional carers, from forced choice of 'professional carer', 'informal carer' and 'other'. While it is not clear whether all these responses are honest, it is at least an indication that many Mechanical Turk users are familiar with caring.

While this study distinguishes between different types of stressor that a carer might experience, we do not distinguish between carers of people with different health conditions. There might be a considerable difference between offering emotional support for palliative care and long-term mental health care for instance.

This study investigates which type of support to use if the stressor is known - we do not investigate how the stressor can be detected. We anticipate that this emotional support could implemented in a system that makes use of sentiment analysis [16] to detect the stressor from social network status posts or by prompting the carer to write something about their day.

4   Conclusion

We have found evidence that the emotional support to provide to carers in stressful situations may need to be adapted to carer personality. We have also found support for [20], that emotional support should adapt to stressor. In future

work we plan to investigate other personality traits, expand on the number and type of messages provided and consider the effects of gender and culture. Additionally, whilst this paper has investigated the emotional support people would provide, this may not be the same as what people would like to receive. We will therefore also investigate the effectiveness of emotional support messages and adaptations on carers with differing personality traits.

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