# Dr Shubha Sreenivas

Pawsome Support for Confident Reading in Children and Easing Stress for University Students

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**Professor Mandy Robbins**: Hello. Good evening. Should I try that again? Hello. Good evening.

Thank you very much for coming this evening to the presentation that Shubha is going to give us. Please feel welcome, staff, students and guests as well. I would like to welcome you to this next one of our Wrexham Talks and it's good to see some old and familiar faces in the crowd as well.

So, I have the joy of doing the health and safety bit. We are not expecting a fire alarm this evening, if there is one, please could you follow the signs for the Quad and make your way through that exit and members of the research team will be there, just looking at Jack, to guide you should that be necessary. There we are. Thank you Jack, that's very helpful.

Just to say, Shubha is going to present for about 40- 45 minutes and at the end of that time, there'll be the opportunity for you to ask any questions that you might have for Shubha. I'm just delighted to be able to share this presentation from Shubha, having been on your interview panel many years ago. So, Shubha came to work in the psychology department back in 2018 and she's our specialist in biological psychology. Shubha brought; I could do with my glasses; Shubha brought with her a wealth of experience from her research and her practice. Shubha’s PhD focussed on self-attribution of facial appearance as an early predictor of improvement in depressive mood state. This is in line with her previous clinical research, aimed at understanding the behavioural and neural activity that are related to mood disorders. Following the completion of her PhD in 2016, Shubha worked predominantly with older adult psychological services at Betsi Cadwaladr as an assistant psychologist. In this role, she conducted neuropsychology assessments to support dementia diagnosis and worked with the community mental health teams. Shubha has also worked as a data manager for clinical trials units, and in 2020 she achieved Chartered Psychologist status. She's also worked with our students, some of whom are here this evening with a Operata, who's a company that develops health apps and they've now expanded that to offer digital clinical trial platform, this was to identify the unmet needs of carers and patients with rare genetic diseases.

Shubha is going to talk to us this evening about her research with therapy dogs and after this presentation, there’s the opportunity to go along the corridor and to meet some of those therapy dogs, if you would like to do that. This is something that I know is very, very close to Shubha's heart. Alongside her research with therapy dogs, Shubha has her own dogs, including a wonderful rescue dog called Walter who she fostered for a short period of time, three years ago. The only person who seemed surprised that he was going to stay was Shubha. When she chose the team meeting, she decided to keep Walter me were like ‘oh okay’.

The title of this evening's presentation is Pawsome Support for Confident Reading in Children and Easing Stress for University Students. I do have to say, just as an aside, and she will be expecting this, Shubha submitted one of the most disappointing ethics forms I've ever seen. The title for her research was Reading Dogs, I thought ‘that's amazing’ but it quickly transpired the dogs weren't actually doing the reading. Shubha I will hand over to you. Thank you very much.

**Dr Shubha Sreenivas:** Thank you Mandy for that, lightening the mood. Thank you all for being here, actually. I didn't expect quite a lot of people, so I'm really happy about that. I'd also like to thank our therapy dog teams who are in the other room, B07 just down the corridor, they are joining us via the team's link so they can listen to us. They are part of the collaborative, aspect of the one of the research that I conducted, so they are keen to know the results as well.

So today I'm going to talk about two of the research that I've done, both with dogs. One as Mandy mentioned, reading dogs in primary school, that is in relation to children's confidence in reading and the other one is using therapy dogs for university students. But before we get into that, I just want you to think about the journey that these two species, humans and dogs made over the several hundreds of years or thousands of the evolutionary period where they bonded and how we got to the point to actually see the therapeutic value in that relationship so quick.

So, we know dogs evolved from the wolves, right and there's evidence to suggest that the domestication of wolves happened sometime over 35,000 years ago. I mean, this is not, everyone doesn't agree with this time period, but it's around quite a long time ago actually and we know that based on the migration that happened from Siberia, the grey wolves moving from Siberia to Europe along with the human counterparts. We know the link between wolves and dogs based on the studies on natural selection. So, the way we adapted to the various environments over the years see variations in our genetic material, the gene variations, the chromosomal variations that occurred kind of gives us a glimpse of the connections. So, we know that there are gene variations that occur that shape the skull, the jawline of the wolf, which is also seen in dogs but also the superpower, the sense of smell that seems to have also changed dramatically multiple times and it just shows you how crucial it is for their survival and that's also seen in both wolves as well as in dogs, so you kind of map that and see that's how the evolution happened. It looks like the sense of smell, the superpower, may have something to do with how we started interacting humans and wolves.

So, there is a theory that the initial interaction between humans and wolves actually occurred in the last Glacial Maximum, this is the last ice age. So, when most of the earth is covered in ice sheets, we were kind of sharing the resources with wolves and the space as well. So, they've probably seen the mutual benefits is one of the theories that living together in a space shared, so humans’ kind of recognising the use of wolves for hunting as well as wolves realising some food in there for them. You can also see that this relationship kind of goes further and beyond the utilitarian sort of limits. So, it's not just for hunting or herding animals. This seems to be a relationship that's forged, that goes beyond a little bit of emotional relationship there and that we know from the remains of a burial found in Germany about 100 years ago and this burial had skeletal remains of humans, an older male and a younger female, and also partial skeletal remains of a dog. A re-examination of this, they realise it's not just one dog actually, there was more than one, so there's a young dog and an older dog. Now, the narrative around that burial changed because of that because it seems like that it's a unit, some sort of family domestic unit there. What was also interesting is that the some of the indications on the jaw bone indicated some disease that the dogs had and they couldn't have survived to their age without the care of the humans. So, you just seeing that bone evolving beyond utilitarian, if you like. As we evolved, humans, and we learned the art of storytelling, we started to even immortalise that relationship that we have with dogs.

The famous dog Argos, who is the loyal dog of Odysseus, waited for 20 years, and when he came back in disguise, it was only Argos who recognised him. Likewise, you know loyalty of dogs in Indian mythology but also as companion of souls in Egyptian and Welsh mythology and guardians of our world, this and the other worlds, in North and Greek mythology. So, we do seem to cherish our dogs.

That's Walter, my hound, he looks quite handsome in a different angle, and that's my pack Tilly, Juno and Walter. They came into my world and changed it totally, it’s full of dog hairs now. Okay, so at some point we realise the value, the therapeutic value of dogs, and that started sometime in 1960s when Levinson, who was a child psychologist, by pure chance saw this interaction between his client and his dog Jingles, I like that name. Actually, in that session, the child initially interacted with the dog before he interacted with the psychologist and he started using this approach where possible and these are the things that he the observed:

* Non-judgmental relationship - now, I do have a little bit of I don't know if I agree with that fully, because I know my dogs do judge me at times, the looks I get.
* Complete and mutual acceptance - now that I agree because they do give us that total unconditional regard and acceptance and if you think about it, that actually links with the Rogerian sort of concept of person-centred therapy to feel that, isn't it, and that's what dogs are giving us.
* Dogs can’t talk back. Good or bad, it depends on the situation I suppose. But another, you know, point that Levinson noted now, these are points that we will actually reflect back when we are discussing the results of the studies as well.

What I like about this is that the comparison that restlessness in a child, and how the child can relate that to the restlessness in a dog, and it’s almost normalising that restlessness, but most importantly, what he pointed out is that distress child, they don't want to be judged. What they really want is to be accepted, admired and permitted to regress. This is when they have a little bit of tantrum, it's okay to give them the space to do it. That's because they can't actually control their emotions at that stage and not to feel guilty about it and these are things that the dogs can provide them with. Since we have seen the, you know, increased use of dog assisted therapies, interventions, there's plenty of evidence that indicates the benefits of dog therapy in physical health, mental health and care settings. What I want to kind of highlight is the physiological responses that actually happens in our body, so that lowering of cortisol levels, blood pressure, managing heart rate and our alpha waves (the brainwaves) calm brainwaves and blood oxygenation. What I like about that is the cortisol level reduction, I mean, cortisol is a primary stress hormone in our body. We need that for our functioning. So when we wake up in the morning, we have higher levels of cortisol in our body and we need that to face the day, you know, have the energy to actually do something but when we are stressed at higher levels of stress, the levels of cortisol increase in the body as well and sustained stress means sustained higher levels of cortisol and that is not so good for our body, so it's detrimental. So having a brief encounter with the dog and it releases this level of cortisol, so that's quite something. And the rest of the aspects, how it can influence psychological well-being. There is even some evidence of canine assisted mediation. Apparently, it started with couples when they're separating, but it seems to be used in other contexts as well now and we know about the education settings, you know, dogs are used for managing emotional difficulties in children or behaviour management as it is referred to.

More importantly about increasing the confidence and improving the relationship of the child with their peers, with their teachers in the in the school, as well as that relationship at school itself. So quite interesting that and that's where the first study comes into play. So, this is looking at the confidence in reading in primary school children and how having a dog might actually be beneficial. Now, the idea came about when I had this two different information, one was Rich Picking and Jo Pike had this brilliant study where they used robotic cats, wasn't it, as companions for people with dementia around the same time there is our friend, Mr. Ian Keith, who was then the primary school head teacher, right in Llandudno and he had this idea of using dogs in primary school for the children to read to and I thought oh what a brilliant idea to bring that as a controlled study to look at the three different groups, children reading to a dog, a robotic dog, or reading as usual to their teacher and see what the difference is in their experiences as well as their reading abilities. So that's where we started off. Our colleagues who collaborated on this project, Julie Myers, she's a senior lecturer in computing here and of course, also Rich Picking. We also had psychology students as research assistants. So, Kirsty Rogers and Andy Payne we have both of them here today, they have since graduated and gone on to do bigger things in psychology. Kirsty is actually doing her PhD here with us on an interesting topic inter-generational activities and interaction and the benefits of it. How interesting is that?

So, to bring back to this research, we also had external collaborators, the different schools, all these schools are in North Wales, these are all primary schools: Ysgol San Sior, Ysgol Gwenfro and Ysgol Penmorfa. They took their time to engage with this research but unfortunately, we had the pandemic to deal with so we only had data from three of those schools. The study was also part funded by GwE which is a North Wales regional school improvement service. So, what did we do? So, the participants for the study was primary school children and teachers and we were looking at the entry criteria for the study was that reading schools, we wanted the students to kind of the children to be somewhere between 85 and 90, meaning they would be below average reading ability kind of category. The reason being unlike, you know, talking, it's a little bit more anxiety provoking when you're starting to learn to read because you have these cognitive and non-cognitive components of reading. So, when the child is trying to learn to read, they need to recognise the sounds that goes with the shapes. The phonemes and the grapheme and you need to kind of pull that together and say, how does that word, how do you pronounce that word and what that word means and how that changes with the additional letters added to it, the, you know, the morpheme. So all of that information really is something that the child builds gradually but for that to happen, you need that non-cognitive component for the child to be able to actually start reading, trying, attempting and that links to the self-efficacy, the concept that if the child feels that they are able to or they are capable of reading, then they are motivated to read and therefore they engage with that reading.

So that was the idea. So that's where we were targeting because we knew the dogs couldn't really help with the cognitive aspects of it. We used a mixed design, meaning we got the qualitative and quantitative aspects. So, the qualitative the experience side of ‘what did the children feel/ experience’ while they were reading in the scenarios, as well as the measurable aspects like the reading scores. So, we measured that at baseline after the intervention after the term one and at the end of the year, we had the plan for it, but it didn't quite work because of the pandemic. So, this is what we did. We placed the eligible children who consented in one of the three groups. So that was the reading to dogs, that's actually one of the children who were part of the study, reading to Ellen the dog in San Sior, and that's a robotic dog, just like our biscuit here on the table, as well as the reading to a teacher or a teaching assistant. Now, the way we allocated the groups, we had to be a little bit sensitive because they were very young children, so we gave them the choice and where there was a bit of competition the teachers had to negotiate with them. So, it would be like if the child wanted to read to the robotic dog but was placed to read to a teacher, then they got to play with the robotic dog at the end of the day, or even the dog if they wanted to. So that was the deal. And the intervention was a 1 to 1 reading for ten minutes and that repeated three times a week, over three days and this is an intervention additional to their curriculum, so we didn't change anything of what they do on a day-to-day basis we just did this as an additional activity. So, you can imagine the additional time the teachers had to put in and I do appreciate that, really. At the time of lockdown, when you had to kind of wind up the study, we had interviews with six children, five, teachers, and we had reading scores for seven children from two different schools. So we had to think do a little bit of rethinking about the how we manage the data. The qualitative side was fine because we could look at the patterns emerging, you know, the different experiences that the children had and we could kind of construct themes for that but with reading scores, we couldn't do a comparison of before and after as a group. So, we looked at it as a case study, looking at how each child actually changed their reading ability.

These are the major themes from the interview:

* Positive reinforcement and motivation.
* Engagement and relationship.
* Gaining confidence
* Reading improvements

This is what I had, this wasn't something expected, but how that maps onto the self-determination theory, as a psychologist, I do like that. So, the theory states that the intrinsic motivation, that's the internal drive to do something, that requires three basic psychological needs. The first one being relatedness, you can see how that easily links to the engagement and relationship. Autonomy, that is the person trying to do a behaviour on their own volition, so initiating a behaviour and for that to happen, they need some confidence, right? So that links with the gaining confidence element and the competence. The child may or may not have in, in reality improved, but it's about the child's perception whether they have improved or not. The competence is kind of linked to the reading improvements.

We're just going to look at the themes in a little bit more detail. So, the positive reinforcement and motivation came from three different kind of the external internal as well as the wellbeing aspects of the child. The external being the 1 to 1 time that they had and it didn't matter whether that was with a dog or a robotic dog or a teacher, they appreciated that. The other aspect is non-judgemental experience, this kind of links back to what Levinson had already mentioned, that comes through quite strongly from children. You wouldn't think primary school in children actually thinking so deep, but they do, and then having the opportunity to read without interruptions, they really wanted that. Internal aspects where they were feeling okay to try, they really feel like they are okay to try, they are motivated to try more. They also like reading to the dog and robotic dog.

This is a bit of interview excerpts that I'm going to share with you. The teachers observation: “…The children were always really, really, keen to do it… nobody wanted to drop out… some children would complain…on a day… they missed their reading session…”, so if the school had a closure unexpectedly and it was their day of reading, they were unhappy about that and they would make sure that they got that opportunity another time, so they really enjoyed it. This is a child reading to a dog: “Because a human actually can read and then when somebody else is reading… you’re like… oh what are they going to say” Right. The fear of judgement coming through. “and then with a dog… they are not going to say anything.” Reflect back to Levinson's point of dogs don't talk back and in this case, it's quite positive and “So, they can’t… like say words or kind of interrupt you”. The fear of, you know, they don't like that dislike of interruption. The child reading to a dog: “So, whenever I say a word somebody would say the word correct which is kind of annoying.” You get that, don't you? Finally. The fear of judgement again “I feel like reading to somebody that won’t judge”. It’s a young kid, young children say, thinking about these things.

Engagement and relationship and the subthemes are bonding, feeling like they are being listened to as well as interaction. They wanted interaction, but different children want a different type of interactions, if you like and they also wanted the quiet space for reading. This is the a child reading to a dog: “you get to stroke it”. It's a process of bonding isn't it but also think of the physiological response that the child's body is going through, that stroking the dog, reducing their stress levels while they're engaging with an anxiety provoking sort of reading, if you like. This is teacher's observation, Gwen, they named the robotic dog every school: “…she is much more reactive. So, if you stroke she responds…, whereas Roxy, the real dog, just kind of lay there and ignored everybody…”. Not so good, they were happy about that. That reflects of the child's comment there: “She's not listening to me”. This is a child reading to a teacher “Because it’s nice and relaxing… Miss R loves reading”, that shared experience, that shared pleasure in that moment. They appreciate that.

Gaining confidence. These are things, feeling superior, trying bigger words and aiming for validation. This is the child reading to a robotic dog: “he doesn’t really understand the books and I do.” Isn't that quite something because it's relative isn't it for the child? He's now on the superior sort of level of reading, so he's happy to do that. Reading to a dog: “I am making sure I read stuff right and bigger words I always put my finger there to spell”. I like this because this is the child actively thinking about the graphic, following the shape and the sound going together, and they are actually applying what they learned in their classes while they're reading. This is an additional step that they're doing. This is a child reading to a dog: “Erm. Well, I feel like since I have read with the dog, my confidence has grown so… I want to do it to the teacher to show… my confidence has grown and that I’m better in reading”. How sweet is that? They know they are better. They feel that but they want validation from their teacher.

Reading improvements, Child as the initiator, so this is kind of linking to the growth mindset where the individual is kind of exploring to expand their knowledge base. They are taking the initiative and feeling able to try bigger books and improve reading. So: “Whenever I have a book I have to read it to Miley but when I’m done that book and the timer isn’t finished I have to get a new book… and read it to Miley until the timer is done”. So, they're not just finishing an action or an activity, they are utilising the full time that they've got to continue reading. Reading to a robotic dog, this child: “I just read more I think, so I am reading a big, like a big book right now”. I couldn't remember the name, but I remember this child because they were absolutely sure that they didn't improve. They say, no, I don't think my reading has improved, but they do remember that they are trying bigger books, you know, trying to read bigger books. The final observation of the teacher: “…the children who picked up books that were longer than they could read in their session, they did go back to those books and continue… well actually, quite a few of them got more accurate and faster”. So, the teachers actually observing that improvement in the children.

These are the relating to the reading scores of the seven children that we got. I'll explain, it's a difference between the two scores. So, before the intervention and at the end of term one, after a space, a time, for the intervention, if you like. If the two scores were the same and they didn't make any difference, you would expect that on the line zero and if they improved, you would see the child scores above zero. Where the child's reading scores worsened, you would see that the below the line of zero. You've got two children here who's reading scores were kind of worse after the intervention, but what we don't know is that experience, because we don't have the link to the interviews, whether we did actually interview the children or not, we don't know that yet. That is a shame, but something to kind of bear in mind when we go and do future studies, I suppose, but what is important is that five out of the seven children, they had improved reading scores. This is just with that intervention of just children reading, there was no intervention, there was no correction, it was just children reading additionally, whatever they liked really. They were all based in different groups, three of the children were reading to a dog, two children to a robotic dog, and two children to the teacher.

Then this is the model that we proposed on the basis of the interview, the data from the interview, as well as discussions with the teachers from the schools. I would say this is a co-production with the teachers because it was their idea as well. The idea is to first provide the stage, a step, for the children to kind of read in a non-judgmental kind of space where they feel okay to try. Then the next stage to facilitate that, nurture that reading behaviour, to use positive reinforcement, whether that is additional time with a robotic dog or whatever motivates the child if you like, and then final stage to allow the child to kind of gain that growth mindset, to try and correct themselves, learn a bit more, giving them the power to kind of ask questions. This is a proposed model, we haven't yet tested it, it would be nice to do some research in future to do that, potentially.

The second study, this is looking at a brief dog therapy session and what that has an impact on university students. The collaborators my colleagues Dr Natalie Roch, Principal Lecturer in Psychology, she's actually my boss and Angela Winstanley, Senior Lecturer in Animal Behaviour studies based in Northop, and Kirsty Rogers, colleague and PhD student. We also have student collaborators on this project, all psychology students, Alys Jones, Emma Akenson, Phoebe Barbar, Emma Telfer and Thomas Crowley. Two of the students have since graduated and finished their degree, the rest are here, they are here today. Could we have hands up, thank you.

The idea for this research, the theory behind it, is looking at the biopsychological theory of emotions, which is it's saying that the environment, how we respond, how our physiology responds to the environment, and how that makes us interpret the emotions, if you like. If it's a positive environment, we might actually interpret things a little bit more positively, so that's what we were testing and we had the excellent collaborators Therapy Dog Nationwide. Brilliant team, we had several of their therapy dogs on several days, actually. We had five days of data collection on Plas Coch campus, and I think we had one in Northop as well, didn't we? Yeah. The study was part funded by our Faculty of Social and Life Sciences as well, which is great.

We had 122 students who completed the study, criteria just being that they should be 18 or over and a university student at Wrexham. Exclusion being fear of dogs and allergy to dogs and dog hair. We used repeated measures design just basically comparing before and after. We measured things like their well-being score, we looked at their anxiety levels and we looked at the perceived stress and we looked how they did at the baseline before the therapy session and after the therapy session. The procedure was quite simple really, we placed five students in a group and they got 15 to 20 minutes with a dog. Not a lot of time, if you just think of a 1 to 1 time, it's probably like four minutes, if that and we just compared the wellbeing scores, anxiety scores and stress scores.

This is what we found. This is relating to the wellbeing, the first column is before the scores, before the therapy and the second column being scores after the therapy. The positive experience, as you can see, slightly increased and the negative experiences decreased. It's a balance, a better balance between the two emotions just with that 15 minute or so you got to bear in mind here, so that brief. Then state and trait anxiety measures again show a similar pattern after that 15-minute therapy session, it's kind of reduced and this is actually the state anxiety measure was significantly kind of reduced but the medium effect means it just a reasonably good effect of the therapy on the state anxiety levels. Similar pattern with perceived stress reduced after the intervention, just 15 minutes, that's all it is and it makes a big difference in the person's well-being. W have taken this on board, and we have been using dog therapy sessions for our students, we had it last year, didn't we? And we had it for this enrichment week as well, just a couple of weeks ago. So, we do utilise it, it's a simple method, accessible and a lot of fun as well.

I think that is it. This is a quick summary that reading to dogs for the primary school children does improve their confidence, reading confidence, but also the proposed three step model of how we can improve their confidence to reading. Then, a very brief intervention of dog therapy, how that improves wellbeing, reduces stress and reduces anxiety. What's not to like? Those are the references and this is my reminder to remind you that we got therapy dogs in B07 just down the corridor. Osian is such a lovely dog, we did have to say hello earlier. Please go and say hello to them, they're lovely dogs.

Then I do have one more request. We are interested in developing this community research in psychology, so we are inviting community members to join hands with us to think about research ideas, to develop and do that research with us as partners. If you are interested, that's the QR code to express your interest. You can share that as wide as you want and hopefully, we will be able to do something in future. I think that's it from me. Thank you all. Thank you very much.