

Critical processes for infant development – an interview with Professor Edward Tronick

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Introduction

We are delighted to front this issue of the *Norland Educare Research Journal* with an interview with Professor Edward Tronick, a world-class researcher and developmental and clinical psychologist. Edward Tronick is Distinguished Professor of Psychology and Director of the Child Development Unit at the University of Massachusetts, Boston. He is also Associate Professor at the Graduate School of Education and the School of Public Health at Harvard University, and Chief Faculty for the acclaimed Fellowship in Early Relational Health at UMass Chan Medical School.

Professor Tronick has had an exceptional and highly distinguished career as a developmental and clinical psychologist. He has worked closely with numerous leading scholars, including Dr Barry Brazelton, and helped to develop the Neonatal Behavioural Assessment Scale and the Touchpoints project. Professor Tronick is a world-leading researcher who created the face-to-face still-face experiment, which was a landmark in understanding infant neurophysiology and the relational dyad

between infant and carer. His pioneering work, which has included numerous cross-cultural studies, has brought new insights into the effects of maternal depression on infants' social and emotional development. His current research is focusing on infant memory for stress and the epigenetic processes affecting behaviour. He has published over 200 scientific articles and books and is internationally renowned for his trailblazing contributions to the field.

In an interview with Dr Janet Rose, the Norland Principal, Professor Tronick imparted the key tenets of his groundbreaking research on dynamic systems theory for dyadic infant–adult interactions and the development of the face-to-face still-face experiment paradigm – all of which have significant messages for professional educators. His work – like that of Penelope Leach, who was interviewed for our first edition – emphasises the significance of relationships for a child's development, but foremost within this is how the repair–recovery process of interactions between caregiver and child appears to be a pivotal factor for building resilience.

The journey to the face-to-face still-face experiment

I began my studies at the University of Wisconsin. It was an experimental and empirically oriented programme that I was in, and primarily I was trained to be an experimental psychologist. At that time, we were just beginning to get a sense of some of the capacities that infants had. There was the work on visual attention and some work on memory and infants, which was all very cognitive. My initial interest was what kind of cognitive capacities did the infant have and what kind of experience did the infant need to develop those kinds of capacities. It was focused very much on terms of stimulation of the infant, giving them the right kind of cognitive input, that would allow their brains to develop.

At the same time, I worked with Harry Harlow's primate study, and the first study for my dissertation was where I looked at infant monkeys to evaluate their visual capacity and how their social experiences were really critical. Harlow showed that animals deprived of social experience didn't develop in a typical way.

Harlow, along with Mary Ainsworth and John Bowlby, were creating a very different view about development, and while my primary training was in this experimental work, I also absorbed what was going on in terms of these aspects of social development. After I graduated with my doctorate, I went to work in my first position at Harvard University in the psychology department. I began to work with the paediatrician Barry Brazelton, who was very interested in social development. I brought my experimental approach to the work on social development. I think the most important thing that I realised – and this is something that carers can think about for the developing infant and developing young child – is that the most critical experiences that they have are their social experiences: experiences with parents, siblings and caregivers.

There was a revolution in how we think about the brain. As powerful as it is cognitively, it is really set up for us to be socially engaged, and we were recognising that infants who are not getting 'good enough' early social experiences, or 'good enough' parenting, as Winnicott would call it, don't develop well. So, the focus of work with families by professional carers needs to take into account the social environment for the infant. Good-enough early social experience with primary carers, as well as with other people that the infant engages with, are foundational to all of the rest of the development that the infant has to have.

Making meaning together

One of the things that I had to focus on when I was beginning to get interested in social-emotional development was: how does the infant organise themselves? To choose another way of saying it, how do they make sense out of the world that they're born into? There certainly is some evolutionary preparation for the infant to be social, to engage in the world, but each infant is born into a unique environment; their parents are unique, where they're living is unique, their moment-by-moment experiences are unique.

When we start to think about infants in different cultures being reared with different caretaking practices, there is no way that the infant could be prepared to say, 'I'm going to be British, I'm going to be American, I'm going to be Chilean,' for example. All of that is something that has to be learned and discovered as you're actually dealing with it. It's a little like the anthropology work that I did where I worked with people in Africa, in Kenya and the Congo, and some people in South America, where their caretaking practices are radically different than in the West. Wherever they are, the infant has to figure out: how do I fit in here? How do I come to know what's expected of me? So, the question that was formulated was: how did the infants make meaning of themselves in relation to the world that they're born into? How did they come to understand the world that they're born into? From the work that I did on newborns, you could see these initial capacities that the infant had to learn about the world. They could attend to things, they could reach, they could explore. The infant doesn't have language or other advanced cognitive capacities yet, but they still have to adapt to the world. One of the things we see by the time they're a year old is they have attachment to a particular carer, they discriminate amongst different people, they react to strangers, they learn how to play games with their carer. There's an enormous amount of learning that takes place in the first year of life.

So, what I did was to explore and see how the infant and the carer were able to interact with one another, and I asked, how are they able to do that? When I was still an undergraduate at Cornell University and I took another year of advanced study, I was assigned to be the teaching assistant for Urie Bronfenbrenner. He was in the process of finishing his book on ecological theories of development, and one of the things that he said during one of his lectures was that at the core of his ecological model was the parent and the infant together, and he said, "Someday someone's going to sit in a paediatric office and film what mothers are doing with their babies so that we can see what's going on." That idea stayed deeply inside me, so by the time I went to work at Harvard, the first studies that I started to do were the studies of face-to-face interaction.

The view that we had at that time was that synchrony was the gold standard of what needed to be happening. In attachment theory, for example, we talk about the sensitivity of the parent, and in attachment theory, the more sensitive the parent, the more appropriate the responses. The thinking was that if parents could respond in some sense to almost every signal that the infant gave, the infant would really develop well. We started doing videotapes of mothers in face-to-face interaction with infants. We started with four- and five-month-olds, and then we looked at infants who were six, nine and ten months old and we looked for synchrony. What I was talking about then were those short periods in the interaction which are synchronous – for example, with the mothers smiling and the baby smiling. It seems like they're perfectly attuned to one another. These were some of the first studies that we're doing, this kind of moment by moment, and when we got the data back, we saw those periods of time where the carer and the infant were in wonderful synchronicity, the kind of sync that makes you feel really good when you're watching it. And if you're sharing the same experience with the other person, you might call that intersubjectivity – the two of us are in the same emotional state and we're carrying the same meanings with each other, so we're able to work together to make sense out of what we're doing together.

Dyadic states of consciousness

You could think of an example of an infant playing peekaboo. They come to know how the mother is going to play the game, how she's going to time the game, how they come together, and the infant is having the experience that 'We're making meaning together'. That goes back to the idea that the infant has to make sense of the world. 'What are we doing? We're playing this game, and this game is really important.'

Learning that game is very similar to the way the infant learns how, for example, to cuddle with a parent or how the parent puts him/her to sleep. The child learns these rituals, and what they're doing is to make the same meaning out of the situation with one another. So, just like learning the game, the child learns how to cuddle, how to greet people. Babies don't come into the world knowing how to play peekaboo. It's something that takes almost a year of repetitions to learn. This coming together of meanings is really critical.

When the attunement occurs, what I think is happening is that the infant has what I call a state of consciousness, a sense of meaning about themselves in the world. This state of consciousness guides the way they interact with the world. What's amazing about the interaction between an adult and an infant is that they're able to find ways of communicating with one another, that they're on the same page, and they're making the same meaning out of it. The infant has a state of consciousness, the adult has a state of consciousness. They signal one another back and forth with emotional displays and gestures, and when they come together, when they're fully attuned to one another, they have what I call a dyadic state of consciousness, or a joint state in which they're both aware that they're sharing similar meanings with one another. When they come together, they literally create something new. The infant's state of consciousness expands, it grows. That's what the infant needs to develop, that's the food for the brain. Getting new meanings that come out of social engagement is the way the brain grows. It's meaningful stimulation which helps the infant to gain a better sense of the world.

How mismatching supports learning and builds resilience

When we looked at the data more carefully, there were periods of time where the mother and the infant were not attuned to one another. The baby might be looking away, or the mother might be looking away. The baby might be smiling, and the mother has a neutral face, or the mother might be smiling, and the baby is looking neutral and not very interested in what the mother was doing. So, I had to confront the issue that we were seeing, on average about 30% of the time, the mother and infant in sync, and what I meant by 'in sync' was that they were matching one another, and the rest of the time there was a mismatch. They weren't big changes. The baby was looking away, the mother looking away, the infant smiling, the mother not smiling. At first it was confusing, because we had thought that we would be seeing synchrony, but here was this data that was making it very clear that synchrony was not the typical interactive state between the carer and the infant. And so the question I had to ask was, what's the purpose of this mismatch? After all, we were thinking mismatching is not a good state to be, and that's when I came up with the idea that there was this large proportion of time of mismatching and that those mismatches would get repaired back to matching states. I began to see what the repair was doing, that it was a really critical event, a critical process for the development of the infant.

Bowlby's view, or the Ainsworth view, is that you need to feel trust in your partner – that when you can repair an error with your partner, when you can go from mismatch to match, you can begin to develop trust in them, that you'll be able to repair things when things go wrong. It also means that the infant in the mismatching state is a little bit stressed because of the mismatch, and when it gets repaired the stress is reduced. The infant can trust the carer to repair what's going on, to reduce the

stress. Adults can have similar experiences. If you're going through a difficult transition like moving from one place to another, you start to get disorganised, stressed, you start to have trouble making meaning of it. Why am I doing this? The meaning that you were so satisfied with wherever you were before now starts to come apart and get challenged. If you're lucky enough to have a partner, you can work through to a new set of meanings about what's going on, and you become less anxious. You calm down, and you can feel that this is someone you can trust, who can help you deal with this situation, and that's what the infant learns.

But I think the important thing for your professional carers going into homes is that everybody wants to see the perfect interaction, even though Winnicott said you just have to be 'good enough'. You don't have to be perfect. And, in fact, he said very explicitly, to be perfect is not really the way you want a parent to be with a child. You want there to be mistakes so learning can occur from the mistakes. What the mother and the infant are doing is sophisticated – they're developing new ways of being together through the mismatches. The match can be different than it was before, so it develops new capacities, and it allows for something new to occur. That's what good-enough interactions look like.

That idea is really no different than my idea about rupture and repair. For the carer in the home, what is needed is not just synchrony but also how the infant and carer are able to repair the mismatches. How does a carer work with the infant to overcome that state, and to put it back together into a much more matching, synchronous kind of state? How does she figure it out? How does the infant figure it out? ('What do I need to do in order to come together again?') For carers, seeing attunement is a great thing to see, but the more telling piece is the repair. The infant experiencing mismatching to matching comes to know a sense of security – it goes from a negative state to a positive state. With experience, the infant comes to know in their state of consciousness. They begin to see the world as a place where there are things that have to be overcome, but they can have confidence and can express resilience by overcoming whatever the obstacle might be.

It's not just the parent who makes repairs; the infant also makes them. When we were looking at face-to-face interactions, we did all sorts of statistical manipulations, but what you could see very often was almost half of the repairs were initiated by the infant. Mother and infant are looking away, and the infant turns back and looks at the mother. It's a little like the still-face experiment. Where we see the mother is holding the still face, the infant looks at the mother and gets upset, looks away, but then the infant comes back to the mother and gives her another smile. In this still face, we see the infant very clearly initiating with the mother. In the interactions, it's harder to see it because it goes faster, but we could look to see who looked first, who smiled first, who reached out, so the infant plays a critical role in making the repair. It's not just the parent, although, of course, parents/carers feel like they're the ones who have to do everything.

When we talk about attachment, at least in terms of safety and security, an infant who's had that feeling of a secure attachment has had those moments of misattunement repaired. They learn that you will be there when they need you. These are all things that develop over time. One of the drivers of that process is the reparation of little mismatches over time.

Repairing relationships

The infant develops a relationship that isn't just around security. The infant and the parent have a really unique relationship, but the infant develops unique relationships with multiple individuals, other than the parents. We all have different relationships with different people. Some are characterised by sincerity, a deep feeling of connection, others are characterised by having fun and

humour together. What we see in development is the issue of security and safety, and that's critical, that they're able to deal with the mismatches.

Relationships are different with different people with whom you can be securely attached. The relationship with the primary carer becomes increasingly unique over time because of the amount of time spent together and the kinds of things that you do together. The infant develops a very special kind of relationship with that person. The other parent is going to be doing other things with the infant; they both had similar levels of matching and mismatching, but the interactions did not look the same. Mothers and infants were doing one thing together, fathers and infants were doing another. Professional carers are another person who develops a relationship with the infant that also takes on unique qualities, and hopefully the good qualities like resilience develop with a professional carer, and the feeling of safety with that person may carry over and support an infant whose parent is not quite as successful in developing that security. But the infant has the feeling – 'OK, I can work with this person. When I come back to my parent, I can figure out what to do given that I have this experience with this other person.' So, the infant develops qualities in each of the relationships that spill over into one another, but they don't lead the infant to be the same with each of these individuals.

One example I can give is with grandparents, being one myself. Grandparents can do all sorts of things with their grandchildren, but you ask the two-year-old who has a great relationship with the grandparent to stay overnight with them and the two-year-old has a real problem, because they don't have the same experience and they don't have the same sense of security with that person. Security is needed, but it's dependent on the context of what's going on. The two-year-old who won't stay overnight with the grandparents will be perfectly happy to spend the day with them.

A final message for professional educators

Each relationship brings a different sort of set of meaning-making, processes and dyads when the mismatch may differ, but the core principles of feeling safe and recovery or repair remain true.

Declaration of authorship and no conflict of interest

Dr Janet Rose, the Principal of Norland, has completed a Fellowship in Early Relational Health at UMass Chan Medical School for which Edward Tronick was the Chief Faculty. Participation in this Fellowship has informed Norland's undergraduate and postgraduate programmes, including a revised maternity nurse qualification.