



## PR-P 002: Sleep Associations

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Hello. Welcome to the second episode of Practical Research Parenting. This week we will be talking about sleep associations. Sorry it has taken me so long to get around to it. I had a cold. Hopefully my voice is up to it today. So we will be looking at sleep associations and particularly how they can help and hinder settling to sleep. What I am going to be looking at particularly is the theory of Classical Conditioning. So you can see the outline and all the other resources as usual on

[www.practicalresearchparenting.com/associations](http://www.practicalresearchparenting.com/associations) so it is /associations for this episode. OK, so for an outline of what we are going to look at today. We are going to look at the theory behind sleep associations, so I am looking at classical conditioning here. I am going to argue against some common terms you may have heard: “dysfunctional associations”, “inappropriate associations”, “negative, or bad associations”. I am going to argue that these terms don’t make a lot of sense and why a concerted effort to break these associations may not actually be helpful and that the focus should rather be on building new associations. In that vein I look at how classical conditioning can help us in the formation of new associations.

OK, so let’s get straight in! So, classical conditioning, you may well have heard of Pavlov’s dog. This is what really started, I guess, research into classical conditioning. So Pavlov’s dog, before he (Pavlov) gave it food, he would always ring a bell. So he would ring a bell, then he would go and get the dog’s food, and he started to notice that the dog would start salivating when he just heard the bell, when he hadn’t smelt, or seen the food yet. So this made him think that maybe this bell had become conditioned. So this started off a whole lot of research in this vein. I’ll go through the technical terms for what everything is because I may use them throughout, but I’ll try not to because they do get confusing. So basically the food is the unconditioned stimulus, so that means the dog didn’t need to learn anything, nothing needed to be conditioned for the dog to salivate to the food. The food, biologically, caused the dog to salivate. So the food was the unconditioned stimulus, no learning required, and the salivation was the unconditioned response, again, no learning required to produce that

response from the food. Then the bell became the conditioned stimulus. So the bell was producing a conditioned response, which was very similar to the unconditioned response. You could almost call them the same thing, so I will tend to just refer to the response as salivation. So the bell became the conditioned stimulus that prompted salivation (but this did require learning to occur).

So unfortunately, this makes it sound quite simple. You have the bell precede the food. Then you have those two things become associated. But it is not so easy to apply that to sleep. So if we look at sleep, like actually the falling asleep and being asleep as the unconditioned response. To find an unconditioned stimulus, this is my conjecture, but my conjecture is that it would be that comfortable sleepy feeling that you feel just before you fall asleep. So that is the unconditioned stimulus, when you are feeling comfortable and sleepy, then you fall asleep. I think that involves quite a few factors, so comfort would include physical comfort and security. So physical, if you are too hot or too cold, it is hard to sleep. That sort of thing, but also security, as an adult certainly if you are worried that you thought you heard someone breaking into the house downstairs, you're not going to be falling asleep right then. Similarly for babies, most probably they don't have the same cognitive capacity, but if they are unsure whether they will be safe if there is any danger, then they probably won't be able to fall asleep. The second aspect is feeling sleepy, and we covered the body clock aspect of this last week, and there is also the fatigue aspect. So how long since their last sleep, whether they had much stimulation between now and then, how long they slept for, how well they slept, all that sort of thing. So all that sort of thing goes into sleepy, and the physical and security aspects go into comfort. So that is quite a complex unconditioned stimulus compared to just food. So if we were to try to look for a conditioned stimulus, this would be anything that directly precedes the comfortable sleepy sensation and sleep more often than it doesn't. So it is often paired with this comfortable sleepy sensation.

OK, so you have probably heard a lot about associations. A lot of people do talk about them. You may well have heard the terms "negative associations", "bad sleep habits", "dysfunctional associations", and "inappropriate sleep associations". I strongly disagree with these terms, and I am going to let you know why, but firstly talking about what they are. So, usually they are used to refer to any active settling things you do, so feeding your baby to sleep, rocking your baby to sleep, holding your baby until



they are asleep. They'll often call these negative (bad, dysfunctional...) associations based on the premise that if your baby always needs you to get to sleep then that is hard work for you. And I guess they also worry about the independence of the baby, but under 12 months old, I really wouldn't worry about that so much. But yeah, they are worried that if you are feeding or rocking your babies to sleep then they aren't learning to fall asleep themselves, and they are going to rely on you all the time for falling asleep.

So I disagree with this on a number of levels. There are three main reasons. The first one is a personal reason. I can't call something that feels so wonderful as feeding your baby or hugging your baby as anything negative, like negative, bad, dysfunctional. I think these are very important bonding things and relationship building things, and I don't think it is fair to put a negative label on them. Even if they do become a habit, even then, I wouldn't call it a bad habit. So on a personal level I disagree, but I also disagree on a couple of theoretical levels. Firstly these sorts of arguments seem to be assuming that the feeding, or rocking, is a conditioned stimulus, so it is like the bell, they are assuming. I'm not sure about that. I think it might be better considered an unconditioned stimulus, so more like the food. This was the argument put forward by Whittingham and Douglas in 2014 as well. The argument is that feeding your baby; the breast milk contains nucleotides that facilitate sleep, especially during the night. I found this really interesting when I did read the paper. It was a paper by Sanchez et al in 2009. Interestingly there are quite a few nucleotides that operate, and some of them seem to set the body clock, and others work more like drugs that we'd expect to work by making you sleepy. And they change, so during the night they're going to make your baby sleepy more than during the day. As an aside it means that if you are ever expressing milk, better to express it at roughly the same time of day as someone will be feeding your baby. So I found that really interesting. It is a reason why feeding your baby to sleep might be more of an unconditioned stimulus, it is more of a biological thing that it helps your baby to sleep, not so much a conditioned thing. I suspect the more you do it the classical conditioning would probably play a role, but the biological connection (between feeding and sleep) would probably be much

stronger, and that constant pairing would just strengthen the relationship, it is not what builds and breaks it.

The other thing is the comfort aspect of both feeding and holding your baby. Need for contact is a very biological need. They did some quite cruel experiments to find this out, a long time ago, back when they could get away with it. This was Harlow in 1958; he raised monkeys, baby monkeys in complete isolation. They definitely didn't have contact with their mother, and minimal, if any contact with humans or any other creature really. What they did was they had these poor monkeys in a cage with two inanimate monkeys. One was a wire monkey, and the other was a wire monkey with cloth draped over it, and they changed whether the milk was on the wire monkey or the cloth monkey. They found that the baby monkeys would cling to this cloth monkey all the time, and especially if they were very scared of anything, and they'd only ever go to the wire monkey if they needed food, and if that was where the food was. So this suggested that this need for contact is really a biological need. So that being a biological need suggests again that the hugging, feeding, sort of thing is more like the unconditioned stimulus. It feeds directly into the sleepy, comfortable, secure feelings that I am calling the unconditioned stimulus, so more like the food than like the bell. So the second theoretical reason that I disagree with this argument that feeding or rocking your baby to sleep is a bad association, or an association that you don't want to form, is that Pavlov's dog still salivated to the food, with or without the bell. So to argue that babies can't sleep if they don't have their conditioned stimulus, in this case feeding, or rocking to sleep, is like arguing that the dog would no longer salivate to the food. Well, of course the dog would still salivate to the food. So I don't think that is a fair argument. But, if the feeding and rocking to sleep is a big part of the unconditioned stimulus, then yes, trying to take this unconditioned stimulus away and still expecting the same response, you will have some troubles. So Whittingham and Douglas actually argued that it is dangerous to try to break this association between feeding/rocking and sleep, because you risk breaking the association between that sleepy sensation and sleep. Apparently this is a big problem in adult insomnia, is that when they feel sleepy, they no longer associate that with falling asleep.

OK, so where does this leave us? It means that feeding or rocking your baby to sleep is not necessarily a problem. If it is working for you and working for your baby it's not a problem. I realise that it does become a problem for some people some times.



For example I have been perfectly happy to feed Beth to sleep for most of the 6 months. Apart from trying to put her in her cot and that sort of thing like I talked about last week, but that has always been my fall back – feeding her to sleep. But soon I have my sister’s wedding coming up and other things that mean that I am not going to necessarily be there at bed time. So I really do need to start to build other associations and make sure she is comfortable falling asleep without feeding. So if this feeding or rocking to sleep does become a problem for you, there are things you can do. Of course it is a bit more complex with a baby again, because even though they don’t *need* the food to fall asleep, they are still likely to request or demand the usual settling conditions. So, in order to get this to work you need to set up alternate sleepy and comfort conditions, and we’ll talk about that in a little while. Another thing you can do is focus on setting up new associations. I argue for focusing on setting up new associations and getting them comfortable and sleepy in new environments, rather than focusing on breaking old habits.

OK, so we can use the classical conditioning research to help us set up new associations. So basically two things become associated if one of those things precedes something else more often than it doesn’t. So to set this up and have it help, we need very specific conditions. So, for example, you might be trying to get some sleep cues working for your baby. So these are words, or music, or humming, that sort of thing, that your baby can begin to recognise, and realise ‘when I hear this it is time to feel sleepy and fall asleep’. Ideally, that’d be nice, so that is what we are working towards. To form and maintain an association like this, those cues would need to be frequently followed by a sleepy comfortable feeling, and rarely not followed by a sleepy comfortable feeling. And the cues should be used just before the onset of that sleepy comfortable feeling. Now this is harder said than done because A. you have to predict it, but B. that comfortable, sleepy sensation is really a gradual onset thing. It’s not like food where you can suddenly present it. As you know from when you are falling asleep, it comes on gradually. So my guess is probably the best time to use your cues would be, they’ll probably already be feeling comfortable and sleepy, but just before their eyes begin to droop and their body begins to relax. But that is a guess; I am not exactly sure how to apply it with such a gradual process.

So applying this in practice, as I said, is difficult with babies, so you need to be able to predict when your baby feels this comfortable, sleepy sensation. You need to learn when their eyes are going to start drooping and their body is going to relax. And also, the other thing that makes it tricky is that the reason we'd build up these associations is you want these associations to help get them to sleep, but if you use them too often trying to get them to sleep when it doesn't work, then the association will be lost. So I have tried using this theory to help both of my kids with sleeping, and I have made a lot of mistakes. So I will talk you through my mistakes, and then hopefully, together, we can learn from them. So the first one was, with Zander, I used his seahorse, so that is one of those soft glowing toys that you get, I'll have a link in the show notes to the one that we used, but it is not that important. The difficulties I had with the seahorse was having it present and accessible, if I was walking around for Zander to sleep, I didn't really want to lug a soft seahorse around, it would look a bit odd. And also when I was feeding it'd fall of the couch or I'd have to lean over because I'd swapped sides. It was just really hard having it accessible. The other problem was it had quite a sudden onset, so initially that was fine, but once he got to the age where he was aware and looking around for sounds, I'd turn it on just as he had started to look like he was falling asleep and he would open his eyes and try to strain to sit up and see what was happening. So that was another problem with that. I think, despite those problems, I did start to get some conditioning happening, because I left Zander with mum at one stage, and she used the seahorse and said that he just suddenly relaxed as soon as she put on the seahorse. So maybe that conditioning did work, but once I thought it had worked, I started using it when I wanted him to go to sleep, and then it didn't always work, so that association was very quickly lost.

With Beth I took a slightly different approach. I used my phone with a song on loop. I thought that was a great idea because I could play that song for as long as it took to get Beth to sleep. But she never really seemed to build up an association, and my theory is that it is because I was playing it for too long. I'd put it on when I was trying to get her to sleep, and getting her to sleep might take an hour. So maybe it was not really predictive of sleep, it was also predictive of crying, and bopping, and walking, and fussing, and all those things that happened well before she actually became comfortable, relaxed, and fell asleep. And the second problem was once she did start to seem to settle in her cot a little bit; I had trouble leaving my phone until she was



asleep. I didn't always want to leave my phone in her room. And of course, unlike the seahorse, Beth could never get my phone to play. The seahorse, at that age, in the first year, Zander certainly couldn't use it either, but now he certainly does. At 2 and a half he turns it on at night, I will often hear it without hearing him, because he will wake up, turn on his seahorse, grab a drink of water and go back to sleep. He's been doing that, deliberately turning on his seahorse at night, probably since he was about 1 and a half or so. So that is obviously something that the phone couldn't replace. So based on these mistakes I have made and the theory that we have talked through, I'd suggest some sort of music that can be played with gradually increasing volume, so like something you have on your phone but somehow getting around the problem of leaving your phone, or of course you could use humming, because that is certainly something you could start doing gradually, or key words. The only difficulty with that is that once you do start putting them in their cot, you'd want them to be feeling sleepy fairly soon after you say your keywords and leave the room. As opposed to what Beth does at the moment, which is I put her in her cot and she'll play for quite a long time before falling asleep, so those key words would probably, if I did that too often, become associated with the playing rather than the sleeping. But that is something you could try, is the humming, and I guess then ideally, you could come to the doorway and hum that same tune, and hopefully they will get the message that they should be sleeping. That's the theory anyway, and as I said before, play or sing just before their eyes start to droop and their body starts to relax. And use it when you are trying to settle them everywhere, so when you are settling them in the pram, the carrier, the cot, feeding, whatever you usually do. Make sure that you use it on a variety of different things because, for example, if you always rock your baby to sleep then that rocking that physical comfort is probably going to be more strongly associated with that sleepy, comfortable sensation. If you use the cues with only that method, they won't be adding any information for them and therefore that association may not build, because there is that biological connection between the hugging and the comfort and the cues add no additional information. Whereas if you use them with a lot of different methods, so if you use them when you are carrying, hugging, feeding, in their cot, all that sort of thing, then the cues are adding some extra

information they are the sound you hear just before you get sleepy and comfortable anywhere.

OK, so of course it doesn't matter how well you have conditioned your conditioned stimulus, so the bell, if you are just going to remove the unconditioned stimulus immediately and too early. I think if you were to remove the comfortable and sleepy sensation, no matter how good your conditioned stimulus is, I don't think you are going to get your baby to sleep. So as well as working on a conditioned stimulus, at the same time, we want to work on providing alternative unconditioned stimuli. So basically we need to replace the comfortable and sleepy sensation they get from the hugging and feeding with other things, and start to get them familiar with those. So the first one is they need to be comfortable and feeling secure in their cot. A big factor in this is probably familiarity. There are a lot of studies showing, and sorry, I don't have exact references for this, this is just from my memory, from my psychology training. Once we get more familiar with things we begin to like them more. So just having that familiarity with their cot is a good thing to start. What I did for this based on the Dream Baby Guide (<http://practicalresearchparenting.com/2014/10/10/dream-baby-guide-review/>), for both of my children, for Zander I did it from 6 months, with Beth I've done it for a long time, probably since she was a few months old. After each sleep, when they woke up and usually cried for my attention, I'd go in and sing good morning to them and say hello, and open the blinds, and then give them some toys in their cot. I'd wait until they were comfortable enough playing with their toys and then I would leave the room. So the idea of that was getting familiar with their cot, getting them comfortable with the idea of being alone in their cot. So initially you wouldn't want to leave for long, and you wouldn't want to leave if they are screaming, because you want this to be a positive association. So this isn't something we force on them, it is something you take as gradually as you need to for them. I found with both of my kids that they have been quite happy to play in their cot afterwards, and sometimes I will go in and play with them, and usually I will go out and do some other things. So I think that is a really good thing to implement while you are setting up this conditioned stimulus as well. The other thing is warmth. Hugs obviously have a lot of body heat, and something I found really useful in winter was just heating up the surface of Beth's cot. So I used a hot water bottle, and then I would take that out, and check that it was a good temperature for her before I put her in, and I found that worked really well.





The firmness of a hug also provides a lot of comfort, so there are a number of ways that you can try to replicate this in their cot. One of these is to wrap them, but of course, this isn't considered safe after they can roll over. After that time there are still some things that you can do. Something I have used, which is again from the Dream Baby Guide book, is that I put the cot sheets length ways such that there is more to tuck in the sides. And I roll up some towels and shove them down the sides to basically keep the sheet very tight over the body. So that provides some comfort, but if they've wanted to roll over they have tended to get out of it. Another thing that, I've never come to buying it, but that I know a lot of sleep people recommend is the Safe-T-Sleep, which apparently holds your baby in their cot, and provides that firmness, and is that bit more secure and that bit more safe. So I will provide a link [http://www.amazon.com/gp/product/B003BNZRY2/ref=as\\_li\\_qf\\_sp\\_asin\\_il\\_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B003BNZRY2&linkCode=as2&tag=practreseap0a-20&linkId=6NQVSF6567HDKRK4](http://www.amazon.com/gp/product/B003BNZRY2/ref=as_li_qf_sp_asin_il_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=B003BNZRY2&linkCode=as2&tag=practreseap0a-20&linkId=6NQVSF6567HDKRK4), but as I said, I haven't used it, so I am not sure how good it is, I just know that a lot of people do recommend it. That is playing to comfort side of things but for the sleepy side of things you also want to be watching their cues, and making sure they've got adequate stimulation when they're awake, such that they will be able to fall asleep when it is time to sleep, and watching for cues and making sure that they are sleepy when you are putting them down.

So as you can tell, it is quite difficult to get sleep cues to work for getting your baby to sleep, but I am still hopeful that they can work. There are certainly quite a few advocates of them. So I am sure that in some cases you can get them to work, and I had that brief success with Zander. But where sleep associations, I guess, really help with sleep is actually once that sleep routine is more established. Once you have got a routine, for example you do Bath, Change, Story, Sleep, and that is the usual routine, once you do that often enough, and once that is fairly predictably followed by falling asleep, then that routine in a way, maintains itself because that change is associated with reading the story, and the story is associated with the sleep. So it works really well for maintenance, it is a lot more work to use it as an instigator for sleep I guess, but it is possible.

OK, so in summary, let's look at the action points we can get out of this. So active sleep associations aren't inherently a problem, but if they do become a problem for you or for your baby, then the way I'd go about changing them, and I will probably try this with Beth once she gets over her cold and her teething, is that you would continue your usual settling routine, but you'd start to introduce a conditioned stimulus. So this might be humming, or singing, or a few key words, that sort of thing. So you'd use this conditioned stimulus just as their eyes begin to droop, and just before their body relaxes at each sleep time, no matter where you are, or what you are doing to get them to sleep. You'd at the same time work on familiarising your baby with the unconditioned stimulus substitutes. So this is things like cot playtime once they wake up, wrapping them, that sort of thing if you are going to try that. And then once you feel that you are ready to start trying to use this, and you feel that hopefully an association has started to build up, then every now and again, but not all the time, use your cues as you pat your baby in their cot. If it isn't working, so if it doesn't usually work, I wouldn't do it too often, maybe once a day, assuming your baby is sleeping 2-3 times a day, if they're that young. If they are sleeping less you may want to do it every two days, if it isn't predictably working. Then once it starts to work, and hopefully it does, and please leave me feedback to tell me if it does. Once it starts to work then you can start to do it more often, until, hopefully, you can start to do it every time, because more often than not they are falling asleep soon after you say your cues. So you do this so that you can make sure that you are retaining this association between your cues and sleep at other sleep times. And if, like I did with Zander, you do lose this conditioning, you have it, and then you lose it, that is not the end of the world because with classical conditioning, there is a phenomena where these associations spontaneously reform, but also if you attempt to reform them it will be much faster to reform them the second time than it was in building them the first time. So this could really be helpful in the long run. If you do manage to build them up you can probably rebuild them again in the future.

OK, so that is the end of the content for today. So please do let me know if you have used this, or when you have used this, or if you try it. Please do comment on this post, so that's [www.practicalresearchparenting.com/associations](http://www.practicalresearchparenting.com/associations). I would love to hear your learning as well so we can learn from any of the mistakes that you've made too, and I certainly won't be judging, because as you have heard, I haven't really been



successful with using this yet. So yeah, please do comment and tell us what went right, and what went wrong, and tell us what the reasons might be. I'm happy to get into a discussion about how classical conditioning applies to sleep as well, because as I said, this is using a theory and applying it to the sleep, but of course we could probably argue around whether that application is a good way to apply it. So, happy to get in to those sorts of discussions as well. So if you think this information is valuable, please do tell your friends, and consider leaving me a review on iTunes or Stitcher, that would really help get the word out there, and it would be good to have more people accessing, what I think, is valuable information. So as always you can find the notes, and the links, on the show notes at

[www.practicalresearchparenting.com/associations](http://www.practicalresearchparenting.com/associations). I've now made the transcript a sign up only feature (thank you for signing up!), so you can access it, you just have to sign up to my newsletter. The main reason I have done that is the transcripts take a lot of time and effort on my part, and I want to know that people are using them, because if they're not then I won't worry about doing it. So, thank you very much for listening, and next week we will be looking at a scientific review of 5 sleep training methods. So please stay tuned. I am aiming for that to be in 2-3 weeks, preferably 2, possibly 3. So, see you then, thank you, Bye.

## References

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