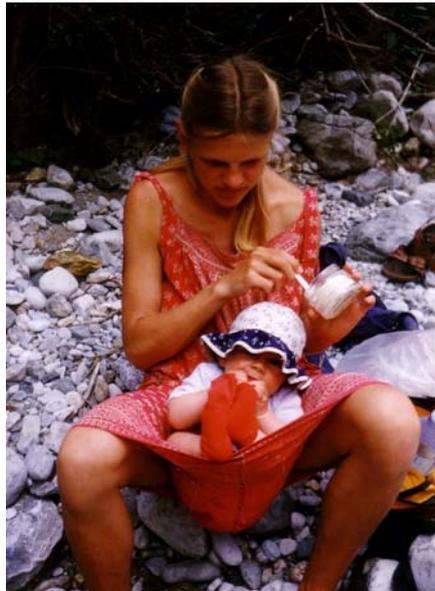


Learning how to eat - a Darwinian perspective

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There's one thing all parents agree about: when it comes to eating, small children are totally unreasonable. They prefer unhealthy foods, all the way from chocolate bars to French fries. And as for fruit and vegetables, not to mention spaghetti sauce, they do their damndest to avoid all such things.

From an evolutionary point of view this is pretty remarkable behaviour, given that throughout almost the whole of human history there has not exactly been a superfluity of food. Children should eat whatever is put in front of them - shouldn't they?

This chapter gives a clear answer to this question: No! Children's mealtime antics are a completely natural phenomenon. But what lies behind it? Why do young children dislike broccoli? How do children's food preferences come into being? Why do native South American children regard roast tarantulas and earthworms as a delicacy, whereas it's burgers and hot dogs for children in the USA? And how is it that they do end up discovering that vegetables won't kill them, and that they might even taste really good?

Why young children don't like broccoli

Animal pictures in children's bedrooms always show pandas eating just one sort of food: bamboo. There's a good reason for this: bamboo is the only thing pandas will eat. This food preference is instinctual, it is part of their very nature.

Human beings are completely different in this respect. In sharp contrast to all other mammals, human beings are able, thanks to their capacity for learning new behaviours, to live in practically any climatic region in the world (and nowadays even in a tiny space station). They can cope with whatever food sources happen to be available, regardless of whether they are in the Arctic with its total absence of vegetables, or in the tropics with their bountiful supply of vitamins. Of all animal types, therefore, it is the omnivore that human beings most closely resemble. No matter whether it's grain, fruit or mushrooms, shellfish or tubers, vegetables or insects, fish or other assorted creatures, packet soup or a formula diet: humans can eat anything - even bamboo shoots! This does of course mean that humans enjoy vastly more freedom of choice than pandas, who - not altogether surprisingly - are faced with extinction; but this freedom has one specific downside, in that food preferences are not pre-programmed into human beings, as instincts are. The food supply varies too much from place to place for that to be possible. And that means that human beings, unlike pandas, face the problem of *choice*.

For scattered amongst the countless good things, there are also others that may look like food but which are in fact unsuitable for human consumption or may even contain lethal toxins - and the good and the bad can resemble each other as closely as blueberries and deadly nightshade do.

In the case of homo sapiens, therefore, every individual has to learn very early in life to evaluate whatever their environment offers them. They must learn to like the things that are good for them - whether it be a grilled tarantula or a Fruit Corner. And they must learn to avoid the things that might harm them.

But how do individuals resolve this 'dilemma of the generalist', as nutrition experts call it? What rules do they follow in learning to like the 'right' foods and confidently reject the others? What is the process whereby their response to different flavours takes shape?

Innate preferences

Whereas humans - unlike pandas - don't come into the world complete with a precise checklist of suitable foods, they are nevertheless equipped with a rough guide enabling them to form judgements about the foodstuffs that are available to them - and this is true for everybody, whether Inuit or astronaut.

For starters, let's consider the *sense of taste*. The taste buds on the tongue have 'antennae' that allow us to determine whether a given food is sweet, sour, salty, bitter or umami (the last of these taste types, identified only in 2002, relates to the amino acid glutamate, which alerts the body to particularly protein-rich foods; the Japanese word 'umami' may be roughly translated as 'fleshy').

Whereas our ability to sense 'sweetness' helps us to identify fruits that are ripe and hence maximally rich in carbohydrates, 'sourness' indicates something unripe, i.e. calorifically inferior, or perhaps even something that has already gone bad. 'Bitterness' likewise implies that the food in question may be unfit for consumption, since bitter substances tend to occur particularly in things that have gone bad, or indeed are inherently poisonous - not least because some plants have learned to produce bitter substances in order to protect themselves and their fruits from predators. Bitter substances can have a paralysing effect on insects, for instance, thus nullifying the threat that they pose. It's no wonder, then, that numerous types of vegetables have only become palatable as a result of domestication! Thus the sweet, juicy carrots and delicious broccoli that we shovel onto our children's plates nowadays certainly didn't originate as vegetables: they are the product of centuries of domestication that systematically removed bitter substances and tannins from the plants.

And what about fats? There are no taste receptors on the tongue specifically for fats - but children none the less show a preference for fatty foods right from infancy, for fats intensify positive taste sensations: fatty foods taste sweeter and fruitier.

It is interesting in this context that whereas children can distinguish 'sweet', 'bitter' and 'sour' from the moment they are born, their perception of 'salty' and 'protein-rich' (umami) only develops after a period of some months - and this makes complete sense: there's no need for these two taste sensations to be activated so long as the mother's breast milk is providing the infant with an ample supply of food rich in proteins and electrolytes. It may also be relevant here that whilst it is true that infants don't like food that tastes bitter, they can be easily fooled by masking the bitterness with something sweet. This changes towards the end of the breast-feeding period: at this point babies will refuse bitter-tasting food.

To summarise: children evaluate food according to whether it is safe, and whether it conduces to their continued survival: anything that tastes sweet, fatty or high in protein is registered as a problem-free, energy-rich ‘survival food’, and is accordingly preferred, whereas anything that tastes bitter or sour is viewed negatively, since this is taken to mean that the food is of poor nutritional value, and may well have gone bad or even be poisonous. This leads us to a startling insight, namely that children’s preference for Nutella and French fries over celery sticks and spinach in fact has a *perfectly sensible basis*, in that individuals partial to foods stuffed with calories were better equipped to survive lean times; and by the same token, children’s resistance to vegetables is not an act of defiance towards their parents, but a precautionary measure in a world full of poisonous plants!

The Garcia effect

In addition to the sense of taste there are also other mechanisms that guide human beings in the direction of safe eating. One such is the so-called *Garcia effect*: once a particular food has provoked nausea or actual vomiting, and thus shown itself to be potentially poisonous, it is avoided for a long time afterwards - at least it is in the case of children.

Fear of the new

Here we have a third factor that characterises the eating preferences of children right across the globe, and which unfailingly drives parents to despair: the rejection of unfamiliar foods. Countless parents are all too aware of this phenomenon, known as ‘neophobia’ (fear of the new). The parents of an infant can proudly vaunt the fact that their child will happily eat a whole range of different foods - pesto, cut-up olives, tomato sauce... But once the infant becomes a toddler it’s a completely different story: woe betide the parent who tries to slip even the tiniest bit of vegetable into their pasta! That the avoidance of new foods amounts to a form of fear is demonstrated not least by the fact that it is shy and timid children that exhibit this behaviour most strongly!

Neophobia develops pretty much on the same timescale in all children. Between the ages of four and six months there is very little sign of it: during this phase most infants will try practically anything that is offered to them. From about eighteen months onwards a child’s range of food preferences gradually contracts, they become ever more critical in their appraisal of food, and ever more hesitant about opening their mouth. Children’s sceptical response to new foods reaches

its peak once they approach the end of the toddler phase and start going to pre-school: at that point children really *are* poor eaters and will often completely reject any foods that are new, complex in taste, or perhaps even bitter. Brassicas are very high on the hit-list of rejected foods, incidentally - and not without reason: they belong to the mustard family and hence contain sulphur, and as such quite often give young children stomach ache. It is only when children are between eight and twelve that their range of foods begins to expand once again, and they begin to try foods that they would never have touched previously, such as mushrooms, strong cheeses, and vegetables such as broccoli.

Traces of neophobia remain with us throughout our entire lives, however, as anyone knows who has ever visited a restaurant in a culturally different part of the world. Indeed the European colonisers of America very nearly starved to death because they simply weren't willing to try the maize that they found there!

A logical process

The evolutionary basis for the phasal development of neophobia is easily explained. In the case of a breastfed child still living entirely within the ambit of its mother there is no reason why it shouldn't carry on enjoying a wide range of different food flavours - after all, its mother (or some other responsible adult) will ensure that everything it gets to eat is completely safe: what mother would feed her baby deadly nightshade instead of blueberries? The situation is very different once the child can explore its environment under its own steam. Its parents no longer have full control over the things that get into its mouth. Its survival is now safeguarded not by its parents, but through a natural process whereby the range of foods it will choose or accept becomes much narrower. All unfamiliar foods are now strenuously avoided - particularly if they are bitter-tasting as well as unfamiliar. Children can only recover a greater openness to different choices and flavours in food when their organs are more fully developed (making them less susceptible to toxins) and when they have discovered through 'social learning' what kinds of food are safe to eat.

Social learning

So much, then, for the 'compass' that at least points our children in the right direction and encourages them to make safe food choices. But what exactly is it that determines their dietary repertoire *long term*? How do children accustom themselves to the range of foods on offer in

their particular environment?

They do so through *following the example of others* and through a process of *familiarisation*.

Experiments show that young children, having initially rejected a particular food, will nonetheless accept it once it has been offered to them ten or so times on successive days. In the case of some foods, therefore, it is not that children eat them because they find them tasty, but rather that they find them tasty because they eat them so often!

At the same time, however, they approach new foods with considerable caution. When trying something for the first time, they will only take a small piece. (Other mammals, too, follow this principle of 'polite reserve': rats, for example, will only bite off tiny chunks of unfamiliar food, then come back for more if the new food doesn't make them ill.)

It has also been shown how much the development of children's food tastes is influenced by the *example of others*. When sitting at the table a child will often spontaneously reach for whatever its mother is putting in her own mouth. This is confirmed by research studies: children between the ages of one and four will try a new food twice as often if a friendly adult takes some of it first! They will also try something more readily if they can see that others - especially their siblings - are enjoying it. It thus seems to be important to children what kind of 'emotional aura' is being displayed by the people in question. And there's no doubt a very sound basis for this: would it be sensible to give the thumbs up to a food that has just made the person eating it grimace?!

In addition, the accustomisation process is further accelerated if the child can have fun with the food. Experiments have shown that foods are more readily accepted if children are allowed to behave in ways that wouldn't normally be encouraged, such as stuffing food into their mouths, sucking at it, throwing it on the floor: tactile experience of a food also appears to be part and parcel of becoming familiar with it.

Pre-programming of food preferences

However, very early experiences of smells and flavours are also decisively important in forming a child's later attitudes to food. Zoologists have long known this: if blueberries are fed to pregnant rabbits, then their progeny prefer eating blueberries! In humans, too, the conditioning they receive in the womb plays an important role in the subsequent development of their tastes in food. In experiments in which traces of garlic, vanilla, aniseed or carrot juice were introduced into the mother's amniotic fluid, their babies, once born, showed a distinct preference for the

relevant flavour.

The flavours present in breast milk - and hence the sorts of food the mother herself is eating - also have a marked influence on the baby; babies given supplementary foods prefer those that taste like the breast milk they are already familiar with. Thus breastfeeding really is a 'trial run through the aisles of a supermarket', as the American neurobiologist Lise Eliot once put it.

Just like breast milk, formula milk can also have a marked effect on a child's food preferences. In experiments, infants fed on hydrolysed (hypoallergenic) formula milk later preferred the sourest varieties of fruit juice, whereas those fed on soya milk preferred apple juice with bitter-tasting additives. Toddlers fed on soya milk are incidentally also keener on broccoli than those given formula derived from cows' milk.

We might also note here that there appear to be key phases in the formation of taste preferences - quite possibly differing from food to food. Thus for instance it is very easy to introduce hydrolysed foods during the first four months, but after that period infants will practically never accept them.

'Supertasters'

Congenital factors also play a part in determining the sort of taste-world that children end up in. Approximately 25 percent of Europeans are so-called 'supertasters' - meaning that they have an especially large number of bitterness receptors on their tongue. Bitter substances thus taste extra-bitter to them. Many children regarded as 'poor eaters' very probably belong to this group. On the other hand they can also identify more subtle variations within the realm of bitter-tasting foods. This may explain why supertasters are disproportionately well represented amongst top chefs. Supertasters are also particularly sensitive to the agreeableness/disagreeableness of different flavours, and thus for instance register very fatty foods as unpleasant. It is scarcely surprising that supertasters (who incidentally include an above-average proportion of Asians) are in general on the slender side: as adults their mean Body Mass Index is only 23.5 (compared to 25.3 in the rest of the population).

Congenital factors also play a role in people's preference for protein-rich foods. In contrast to that, however, they appear to have no bearing on the duration or strength of children's fondness for sweet things.

Disgusting!

In order to assess the risks and opportunities presented by their environment, however, children need yet another aversion mechanism - and an extremely obdurate one it is, too - namely their sense of disgust.

Babies and toddlers show great interest in playing with things that would make an adult gag: snot, vomit and slime of any kind are not in the least bit 'yucky' to a baby -nor indeed are faeces. It is not until children have turned four that they begin to differentiate between pleasant and unpleasant smells: their sense of disgust kicks in at this juncture. By the age of about seven they are on a par with adults in terms of the smells they like and dislike, and their now well developed sense of disgust is also applied to food. No matter where they live in the world, all children find the same things 'disgusting', regardless of whether they have been brought up by a top chef or a rag-and-bone man.

The evolutionary purpose of disgust is easy to see: the disgust response protects us from eating food that has gone bad or is contaminated by pathogens. But in that case, why don't children find anything disgusting during their very early years? Perhaps because feelings of disgust would be completely pointless at this stage; small children can't do anything about the fact that they can't yet control their bowels and therefore constantly come into contact with their excretions. It's also an unalterable fact of life with babies that burping is often accompanied by posset - and it wouldn't help much if they routinely found this disgusting. Small children are simply stuck with the realities of their stage in life. In evolutionary terms, furthermore, infants have always been breastfed (see Chapter 2), and this has no doubt given them considerable protection against the dangers of their exploration of the 'yuck zone'.

Up to the challenge right from the start

So far as food is concerned, the toddler phase brings a more or less cataclysmic change, in that children then pass from a safe area meticulously monitored and guarded by their mother, to a world bristling with dangers. Whereas during their infant stage their main food was breast milk, impeccably hygienic and optimally suited to their needs, toddlers have to satisfy their hunger in a world in which the good-to-eat and the downright inedible exist side by side. To enable them to survive, evolution has equipped children with the following ground-rules:

Always choose 'survival foods' - i.e. precisely those sweet, energy-laden foods that are already your favourites, as these are not only safe, but also fill you up well.

Only eat things you already know. In particular, steer clear of bitter things: they may well contain toxins in considerable quantities.

If you do have to eat something new, then only try a very small bit to begin with.

Eat whatever your parents and brothers and sisters like - that way, you can't go wrong.

Never eat anything that has previously upset your stomach.

These rules lead us to a radical insight: the fact that young children are so choosy and so keen on sweet and fat-rich foods, and at the same time so averse to vegetables, is *part and parcel of their normal development*. Throughout 99% of human history, a child with an unrestrained fondness for vegetables, fruit and berries would soon have been dead!

These protective mechanisms are of course completely superfluous now that supermarket shelves are guaranteed to be free of deadly nightshade, and we can keep an eye on our children's every move within relatively small homes closed off from the big wide world - but it is simply the case that biologically our children still enact a survival strategy that evolved in the jungle, so to speak, and that has served mankind well for hundreds of thousands of years.

Picky toddlers: a positive perspective just for a change

Perhaps we should look at our children's food preferences the other way around, and see the aforementioned ground-rules governing their approach to eating as being in essence quite a success story. For they achieve something that we could otherwise only dream of, in that they bring about a perfect match between supply and demand - and do so everywhere in the world! Even special circumstances of the most extreme kind can be satisfactorily covered by these simple rules. Eating spicy food, for instance, makes good sense in countries where produce quickly goes bad, since there are spices that can kill germs and parasites. In Asia very young children eat hot spices in quantities that would make an adult European almost catch fire. And children readily learn even quite complicated eating rules - in the Andes, for instance, people eat wild potatoes mixed with clay, since that helps to neutralise the toxins they contain.

Cautious - and sensible

We adults like to think of ourselves as always setting a good example to our very young children, but their ability to approach some things more sensibly than we do is demonstrated by their response to a very simple question: at what point should we stop eating? The adult take on this question was revealed through an ingenious experiment. The 54 adult participants found themselves sitting at a table with a bowl of soup in front of them. Unknown to the participants, however, every second bowl was constantly replenished via piping concealed beneath the table. The outcome? - Participants with self-filling bowls ate 73% more soup than the others! And astonishingly enough: when asked, the participants in *both* groups declared themselves to be equally full.

Toddlers behave quite differently, however. Thus for instance 3-year-olds in similar experiments were thoroughly unimpressed by large helpings: they ate exactly the same amount as they usually did, regardless of how much was put on their plate. By the age of five, however, children will go on eating whatever is offered them, no matter how much that may be. In this context there is also another interesting finding: infants offered food with a lower energy level than normal eat a correspondingly larger amount, and conversely they eat less when their food is unusually high in calories. Once they become toddlers, however, children lose this infallible ability to gauge and control their calory intake: if their food is heavier in calories than normal, they still eat the same amount as they would otherwise do - just like adults.

From an evolutionary point of view this ‘default setting’ makes perfect sense: during the phase when babies can’t feed themselves and instead have a supply of breast milk constantly available to them, their body doesn’t need to take in extra supplies of food over and above what it requires at any particular moment. Infants thus appear to be equipped with a built-in ‘program’ quietly telling them that ‘As long as Mum’s providing all your food, you don’t need to lay in extra supplies: once you’re full, just stop eating!’

This only changes once children no longer receive all their sustenance from someone else, and instead start fending for themselves. It now makes good sense for them to seek the maximum possible benefit from any feeding opportunity: when our hunter-gatherer ancestors happened on a mass of ripe blueberries the wisest policy was not to merely grab a handful here and there, but to take full advantage of them and eat every last berry. After all, no one could know when they might next find any food.

They even *drink* sensibly!

Many parents think they need to constantly remind their children to drink in order to prevent them ‘dehydrating’ or suffering some other kind of harm. They might perhaps have heard that very young children, and babies in particular, can’t ‘store’ fluids as well as older children. This is because their kidneys are not yet fully effective at concentrating urine. Nature has provided for this, however, for in the natural order of things infants have ready access during their first years of life to breast milk and can thus take in fluids on a regular basis. It is accordingly no wonder that infants want the breast more often in summer than in winter, and that breastfeeding frequencies vary enormously from one climatic area to another. One thing that this shows us straightaway is that children themselves know best how much fluid they need. Now as ever, therefore, the parents’ job is not to prescribe how much their children should drink, or to keep on reminding them to take a drink, but rather to ensure that a source of fluids is routinely available to them.

‘Routinely’ - in the minds of many parents that means ‘always and at every moment of the day’! As a result they weigh down their pushchairs with drink containers of every kind, or constantly go chasing after their children with beaker in hand, to make absolutely sure they don’t dehydrate. Here too, however, nature has made appropriate provision: the water regime within the bodies of young children adjusts very easily to a varying supply, and they come to no harm if they suffer occasional short periods of thirst in the course of their activities. Their bodies are pre-programmed to make it from waterhole to waterhole, so to speak; or as the USA’s Institute of Medicine puts it: ‘Fluid intake as determined by thirst and hunger is sufficient to maintain normal water balance.’ If sometimes on a walk there’s no drink to hand, children will easily compensate for it later on. By the same token, in the course of the day young children wee sometimes more, sometimes less, and it’s absolutely normal for them to go even several hours without weeing. Healthy human beings derive no benefit from carrying on drinking beyond the point at which their thirst is satisfied - in fact the reverse is true: tanking up on water can cause problems. This was demonstrated in a famous study undertaken in the context of the Boston marathon. Runners who stocked up on water by drinking often and in large quantities suffered in much greater numbers after the race from water and electrolyte imbalances! Paediatrically speaking we might add here that (thank heavens!) there is no clinical evidence to support the complaint made by many parents that their children ‘don’t drink enough’: there have never been any reports of children suffering from an epidemic of kidney stones, and there is no evidence that constipation in children - a not uncommon phenomenon - is caused by a lack of water.

A light at the end of the tunnel

Evolution really does seem to have prepared children extremely well for the business of eating and drinking. The best thing about all this, however, is that the responses that the evolutionary process has equipped them with, and which sometimes drive their parents to distraction, have a built-in 'expiry date' and in due course simply switch themselves off. The more children's organs develop and the more their knowledge of the world around them grows, the more their fear of new foods diminishes. 'Picky' children become steadily bolder, and once they have finished growing they do at long last eat up their vegetables. And yes: even their sweet tooth becomes *less* sweet, for after puberty their hankering for sweet things becomes less marked (though we adults can certainly attest to the fact that our sweet tooth never completely disappears!)

And research studies have confirmed that, whilst 'poor eaters' may not be exactly overflowing with vitamins, choosy children grow no more slowly than others, and are no less healthy so long as they don't develop an eating disorder of some kind. And in any case, eating disorders don't arise from 'eating too few vegetables', but from a child being forced to eat, or routinely suffering stress, pressure and a sense of alienation around the issue of food.

Considered in this light, food and eating are one example (and we shall see many more in the course of this book) of the plain fact that by no means everything that parents anxiously regard as a 'disorder' actually qualifies as such. The pickiness of toddlers originally served as an important aid to their survival, and as such it is a *normal feature of childhood*.

Factors that have made things even more difficult for the children of today

What a curious paradox: while fridges get fuller and fuller, and more and more children are propelled into the Land of Plenty by their bags of crisps, Kinder Eggs, personal TVs and mobile phones, increasing numbers of parents are nevertheless stuffing food into their children's mouths for fear that without it they will inevitably die of starvation.

Perhaps this has something to do with the fact that the ranks of positive role models have considerably thinned out in recent times. As we have already seen, good role models really do make it easier for young children to learn good eating habits. Simply by their example, kindly adults encourage children to try new things. *Kindly* adults, that is. But in reality children are faced with people who are more or less whip-crackers, however well-meaning, who even hand out 'Well done!' stickers to nursery school children who have eaten a molecule or two of broccoli;

they're faced with gaunt-looking parents who are worried to death about them, and with the mothers-in-law of said parents, whose sense of self-esteem depends entirely on whether or not little Jimmy spits his food out. But children don't react well to anxiety or pressure: they need to see eating as *fun*.

The problem is exacerbated by the fact that many other natural role models who traditionally served to ease the path to proper eating are no longer there, such as older siblings, or indeed older children of any sort. Everyone knows that if young children see an older child march into the sea, they will march in too - and by the same token they will also eat whatever the older child eats. This means that first-born children, and children in small families, are potentially in a particularly tough situation.

We might also pose the question whether the development of a child's receptiveness to different flavours is not already being messed up in their very first months of life. For whilst it may well be the case that breastfeeding is a 'trial run through the aisles of a supermarket', it has to be acknowledged that this 'trial run' is often very short these days. And the solids that infants are then given do little to enlarge their repertoire of flavours, given that commercial baby foods are more or less flavourless pap. Babies fed on these products certainly experience a significantly smaller range of tastes than they would if they shared the family's normal meals - a practice that quite a few families have meanwhile begun to embrace ('baby-led weaning': see Chapter 3).

How children become good eaters

To round off this chapter, let us try to look afresh at the rules and restrictions created by the evolutionary process - and see them not as a burden, but as an aid to children's healthy development. And given the circumstances we live in today, what can we ourselves do to help them develop healthy patterns of eating?

During pregnancy

Let us start with the very beginnings of life. Pregnant women should eat the foods that they enjoy, for this ensures that not only they but also the occupant of their womb will have the benefit of a wide range of different flavours. In this, they should not let themselves be deterred by worries about supposed allergy risks: the myth has long since been debunked that the avoidance of certain foods during pregnancy can prevent children from developing allergies. The customs of

numerous traditional cultures are far more sensible in this regard - in these cultures it is pregnant women who are given the most varied and most elaborately prepared foods.

Breastfeeding

Breastfeeding helps to broaden a baby's receptivity to different flavours. In sharp contrast to formula milk, breast milk with its huge variety of flavours conveys an important message by telling the baby that 'This is the range of foods that will predominate in your subsequent life...' It is well known that the longer babies are exclusively breastfed, the larger the spread of flavours they will accept. Breastfed babies whose mothers eat a wide range of foods show a greater readiness later on to try new things than bottle-fed children do, and they are also more amenable to eating fruit, for instance. All of this argues against the view sometimes put forward in the past that breastfeeding mothers should limit the range of foods they eat. Doing so does not reduce the incidence of colic, nor does it prevent allergies.

Forcing children to eat

Forcing children to eat is an absolute no-no. Otherwise the 'Garcia effect' that we discussed earlier will result in an enduring refusal to eat. There is even some evidence that children whose parents compel them to eat weigh less at the age of two than children who are *not* subjected to any compulsion! Fortunately the range of nutritious foods available today is so large that the traditional battle over spinach is no longer necessary in order to ensure that children stay healthy. (The consequences of forcing children to eat were well demonstrated by George W. Bush, then the most powerful man on earth, who shortly after being sworn in found time to make the defiant declaration that he didn't like broccoli - 'and I haven't liked it since I was a little kid when my mother made me eat it, and I'm President of the United States, and I'm not going to eat any more broccoli!')

It's no use trying to pressure children by putting on an air of great anxiety, either! As we have seen, children learn by getting accustomed to new foods in a friendly atmosphere; in matters of food as in other areas, children's behaviour is reinforced when it is met with a positive emotional response.

Rewards?

Can children perhaps be made more enthusiastic about vegetables if we use the *opposite* of compulsion? As for instance when rewards such as stickers are doled out in nursery schools when children eat their vegetables? It can certainly be readily shown that this works in the short term (though only when there is an actual reward of some kind, rather than just words of praise). The question arises, however, as to what kind of broader lesson children are supposed to learn in the context of eating. Is it that they should order their behaviour according to whatever enticements are offered to them by those around them? Isn't this exactly what we should *avoid* in a world now rampant with obesity and eating disorders?

No - when a child refuses to eat healthy food, the only effective strategy is to respond with calm but dogged persistence. Keep offering the food over and over again, a little bit at a time and with a cheerful demeanour.

Sensible meals

But how then are we to deal with the highly conservative tastes of small children? Should parents let their three-year-olds eat nothing but pasta, given that their rejection of the accompanying sauce does appear to have an evolutionary basis?...

Absolutely not! Neophobia works in terms of *cautiousness*, not of a once-and-for-all rejection of anything that isn't immediately palatable. Thus it can't be emphasised too often that whilst children are indeed pre-programmed by evolution to be wary, they are also equipped with a built-in accustomisation protocol that eases their path to an acceptance of more challenging foods. The neophobia mechanism that tends to restrict food choices is counterbalanced by an accustomisation mechanism that serves to *widen* the range of acceptable flavours.

This accustomisation mechanism doesn't function spontaneously, however: it requires a driver - and that driver is *pleasure*, combined with *appetite*! Hunger fosters boldness and thereby ensures that the scope for the acceptance of new flavours is constantly being extended. Hungry children will try out more new flavours than children who are already half full - just as hungry shoppers will always arrive at the till with fuller trolleys.

But how do we get children to arrive at the table feeling hungry? By giving them less to eat beforehand! It only takes 20% of the number of calories found in an average meal to significantly dampen a child's appetite. If children sit down at the table already feeling half full, they can't be expected to show any great desire to experiment. This means that for forty minutes to an hour before meals children should only have zero-calory drinks (preferably water) or low-calory

snacks, such as slices of fruit or vegetables. In particular, the tummy-filling effects of fruit juice and sweetened tea are often under-estimated!

From an evolutionary point of view, then, the answer to the pasta-without-the-sauce question would appear to be ‘Yes, we should allow children to be choosy’ - but *only* within truly realistic limits. Specially contrived ‘children’s meals’ are certainly not part of the evolutionary plan, and until a few generations ago the sheer realities of life ruled out taking recourse to puddings and other sweet foods (‘ - just so that my child at least eats *something!*’) A small child’s natural expectation is that his parents will provide food that they consider both healthy and tasty; no three-year-old is equipped or entitled to draw up their own shopping list. In our evolutionary past there was no such thing as a Land of Plenty.

Should children ‘clear their plate’?

As mentioned earlier, the notion that young children should ‘clear their plate’ doesn’t make sense in evolutionary terms, nor does it make sense in a world in which the portion sizes of everything from chocolate bars to restaurant meals are too big even for people doing the heaviest of manual labour. It is better if the food is dished out initially in modest quantities, or if the child is allowed to help themselves. Seconds are then always possible. If a child’s eyes prove to have been bigger than their tummy, then they need to be allowed to leave whatever they can’t manage, or have it put aside for later.

Presenting food attractively

It can certainly make eating more fun if food is presented in an attractive and child-oriented way - and correspondingly it does children a great kindness if we avoid giving them food that looks decidedly *unattractive*, such as boiled spinach. At the same time, though, the child-friendly element shouldn’t be overdone: what really matters, after all, is the atmosphere around the table, and not whether the serviettes match the tablecloth. And achieving a positive atmosphere at mealtimes means not indulging in family squabbles - and not being heavy-handed about your child’s food intake. And parents who think that they can’t do without their mobile phones or the TV at mealtimes should certainly ask themselves just how important to them the people really are with whom they share their lives in the *real* as opposed to the virtual world.

Should children be allowed to gobble their food?

All human beings tend to eat quickly when they're hungry. This makes perfect sense in evolutionary terms: the hungrier we are, the more important it is to grab the largest possible share of whatever's available at the fastest possible speed - for who knows when the next opportunity will arise, or how long it will be before rivals for the food start muscling in? But is it 'healthier' if we eat slowly, or if we perhaps even follow the advice that occasionally goes the rounds and chew our food 11 times (or 22 or 33) before swallowing? From an evolutionary point of view that is complete rubbish: if food really were digestible only if we ate it slowly, let alone chew each mouthful twenty two times, we'd have long since become extinct. And as for the argument that people who gobble invariably over-eat, experiments have shown that we need have no such worries: youngsters who were asked in test conditions to eat slowly didn't take in any fewer calories than when they were allowed to bolt their food down all in one go.

Declaring peace with poor eaters

The complaint is often heard that babies 'keep wanting more' and are constantly and insatiably glued to their mothers' breast - but once they are toddlers the cry soon goes up that they're now not eating enough. It is certainly true that the appetite of small children often falls far short of their parents' expectations - and *very* far short of the expectations of their grandparents. By way of conclusion let's try here, too, to bury the hatchet by referring back once again to evolution - for there are reasons, indeed very good reasons, for the fact that toddlers don't eat like hungry piglets.

One reason is to be found in that lovely coating of puppy fat that children are born with. This fat-layer is probably there in order to guard against any fluctuations in the food supply during the period of extremely rapid and energy-intensive brain development that occurs in the first two or three years of life. Once children start exploring their world by crawling and then walking, the fat-layer steadily melts away - after all, it would be a considerable waste of energy for a child to remain weighed down with extra pounds when their main aim in life is to play, to be active, to put their bodies and their senses to the test, to see what happens when they turn the world upside down...

Another reason is this: toddlers grow more slowly than infants - indeed *much* more slowly. If young children were to grow during the period from toddlerdom to the start of primary school at the same rate as infants do during their first few months of life, then they would be the size of elephants by the time they entered school! On average, therefore, a two-year-old child only needs

25% more calories than a nine-month-old baby.

Some children, however, do seem to be particularly poor eaters. This may be the case not simply because they are exceptionally ardent broccoli-haters, but because they metabolise their food more effectively. In respect of infants, it is well known that some need less food than others in order to grow. In the first month of life, for instance, some babies drink 400ml of milk per day, whereas others need 800ml to achieve the same rate of growth. Similarly, there are babies of four weeks who drink more milk than a six-month-old! Similar variations occur throughout the toddler years. It is thus not advisable to expect all children to display the same level of enthusiasm at mealtimes.

From an evolutionary point of view, therefore, parents need to realise that it is *not* advisable to regard the vegetable consumption of their children as a measure of how good they are as parents. We live in a world in which - thank heavens - it has become very difficult to starve. This is borne out by the experience of paediatricians: the children of parents who come complaining that they are 'poor eaters' weigh just the same as those who are brought in because of coughs, colds and grazed knees.



This is an excerpt from Dr. Renz-Polster's book: "Kinder verstehen. Born to be wild - wie die Evolution unsere Kinder prägt" (Kösel Publishing House 9th edition, 2016). For more information see <https://www.kinder-verstehen.de/pdf/kinder-verstehen-expose-in-english/>

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