

# Babies Are Not what We Thought: Call for a New Paradigm

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## **Abstract**

Babies are not what we thought they were in the 19th century or even twenty five years ago. Abundant new findings from experimental research, psychotherapy, and anecdotal reports have rendered traditional views of human development obsolete, yet many obstetricians and psychologists continue to view babies in 19th century terms.

The author summarizes the 19th century view and its failings and assembles the evidence for a new paradigm that babies, of whatever age, are aware, expressive, and affected by their interactions with others.

In five specific conclusions and recommendations, the author suggests that those who deal with babies speak of sentience rather than motor handicaps and reflexes, minds rather than brains, and consciousness rather than conditioning. He challenges obstetricians to make it a goal to eliminate all medically-caused pain from normal birth.

## **Zusammenfassung**

Unsere Vorstellungen von Babys sind nicht mehr die des 19. Jahrhunderts, aber auch nicht mehr die, die wir noch vor 25 Jahren hatten. Eine Fülle neuer Befunde aus der experimentellen Forschung, der Psychotherapie und kasuistischen Beobachtungen läßt unsere traditionellen Ansichten über menschliche Entwicklung als überholt erscheinen. Trotzdem fahren viele Geburtshelfer und Psychologen fort,

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Babys aus der Sicht der Vorstellungen des 19. Jahrhunderts zu betrachten.

Deshalb faßt der Autor die Vorstellungen und die Sicht, wie sie im 19. Jahrhundert üblich waren, zusammen und stellt die Mängel dieser Perspektive dar. Er zählt die Belege für das neue Paradigma auf, daß Babys, gleich welchen Alters, bewußt und ausdrucksfähig sind und durch die Beziehungen mit anderen gefühlsmäßig berührt sind.

In fünf spezifischen Schlußfolgerungen und Empfehlungen schlägt der Autor vor, daß diejenigen, die mit Babys umgehen, subjektbezogene Ausdrücke wie Empfinden, Erleben und Bewußtsein verwenden, statt objektivierender Ausdrücke wie motorisches Handicap, Reflexe, Gehirnfunktionen und Konditionierungen. Er fordert, daß die Geburtshelfer es zu ihrem Ziel machen, jegliche durch das medizinische Handeln verursachte Schmerzen bei der normalen Geburt zu vermeiden.

## **Introduction**

Babies are not what we thought they were in the 19th century or even what we thought they were twenty five years ago. During the 20th century while medicine was learning more about baby bodies, psychology was learning about their minds. The results have been surprising. The findings of psychology are so revolutionary that virtually everything we believed a quarter century ago has been discredited and a new encyclopedia of knowledge has been written about the senses, perception, cognition, communication, and personality of babies, both newborn and unborn.<sup>1,2,3,4</sup>

The implications of this revolution are especially important for everyone who has a role in bringing babies into the world: parents, childbirth educators, midwives, nurses, neonatologists, obstetricians, and pediatricians. What concerns me deeply is that medical belief and practice has not kept pace with these psychological discoveries and, if there are no major steps ahead in the next few years, obstetrics is in danger of marching straight into the 21st century with a 19th century view of infants.

## **The 19th Century Paradigm**

In retrospect, the 19th century view of infants was based on a maximum of speculation and minimum of research. Important theorists like Sigmund Freud and Jean Piaget had minimal contact with babies and knew almost nothing about life before birth.

Scientists knew a century ago that the brains of babies were small and undeveloped; they could see how poorly coordinated the motor system was and believed that babies could not organize themselves, control behavior, or attach meaning to experience. On this basis, pain and suffering were impossible, violent reactions were only "reflexes", and smiles and other facial expressions were

“artifacts.” Baby cries were not genuine communication signals and were not respected. When surgery was necessary, babies were paralyzed but given no anesthesia because they could not possibly remember the experience and anesthetics might do more harm than raw surgery. Doctors counted heavily on the fact that whatever they did to babies at birth or before birth would effect their physical bodies and nothing more.

When male physicians took control of birth between 1880 and 1930 they brought these 19th century ideas with them. Therefore, it is no accident that the routines invented for hospital birth turned out to be painful for babies. Even the dramatic reactions to male circumcision were dismissed as something impersonal. Doctors separated babies from their mothers no matter how hard they cried or how hungry they became; babies got bottles instead of breasts, nurses instead of mothers and fathers, and group care rather than the individual care normally given by parents. For a half century now, newborns have been greeted with painful injections, skin punctures, refrigerated air, dazzling lights, stinging eye medication, were slapped to get an Apgar score, straightened out for body measurements, and had their heels lanced for blood samples. While waiting in the birth canal, some babies had their scalps pierced with electrodes.

Back when no one could see into the womb, it was considered a safe place, the placenta a magic protective barrier. Inside, the fetus was considered deaf and dumb. Outside, the newborn was considered blind and senseless, belonged in a nursery in the hospital or at home, and needed sleep more than anything else. In this old paradigm the body was everything; there was no mind. Experience did not accumulate because memory and learning were impossible, and communication to or from babies was unexpected. You will recognize that many of these 19th century ideas are alive and well today, almost a hundred years later. Let us hope they are not carried into the 21st century.

Present misunderstandings about babies are founded on both ancient myths and modern scientific prejudices. The latter, which concern me in this paper, are focused mainly on how the body and brain develop from conception to birth. In the old view, development proceeded from simple to complex forms, single systems to integrated systems. The early brain was “primitive,” the later brain “sophisticated” but not yet mature at birth. Structures would have to be in place before they could function, and these structures were determined by genetics, not experience. If any of the special senses were in evidence, they would not work until “wired” into the cortex some time after birth. This was the old paradigm of human development.

Over the last quarter century, research has been dismantling this rickety framework piece by piece. Briefly summarizing, development can no longer be described as progressing from simple to complex, or from single systems to integrated systems.<sup>5,6</sup> More and more functions are found to be complex at the beginning; a growing list of behaviors are labeled innate.

Early brain parts are, in fact, capable of sophisticated activity and begin to function without waiting for other parts to develop.<sup>7,8</sup> Organs begin to function while still under construction (e.g. the heart). Experience can profoundly alter development, as in sexual development.<sup>9,10</sup> Some special senses start function-

ing early in gestation and are intermodal rather than separate.<sup>11,12</sup> The fetus is not deaf; hearing is actually a primary mode of communication and learning in utero and is adultlike at birth. A baby is not a “bundle of reflexes” or born into a state of “normal autism.”<sup>13</sup> And – most important from a humanitarian viewpoint – the receptors for pain (nociceptors) are in place long before birth.<sup>14,15</sup>

In retrospect, the old paradigm was negative and discouraging; it gave us no basis to celebrate the sensitivity, emotionality, personality, or cognitive genius of babies, left no room for amazing feats or inspiring gazes. The old paradigm was cruel to infants and failed to alert parents and professionals to their surprising intelligence.

### The New View of Infants

A new paradigm has been taking shape gradually and with typical reluctance over the last thirty years.<sup>16,17,18,19</sup> If the real nature of babies is finally recognized it will be because of the explosive growth of psychology (especially into the areas of mind and consciousness) and the emergence of new technologies like intra-uterine phototgraphy,<sup>20</sup> sonography,<sup>21</sup> and radioimmunoassay<sup>7,8</sup> which have allowed us an intimate look at human development.

In an age of specialization, no single discipline has seen and described the *whole* infant. I do not see a new paradigm about infants being heralded in nursing, midwifery, childbirth education, obstetrics, developmental psychology, child psychiatry, or psychoanalysis. The formation of a new global vision of infancy calling for a paradigm shift may fall to those working in pre- and perinatal psychology, a broad, interdisciplinary field which gathers data from all sources.<sup>1,4,19</sup>

A new paradigm, in my opinion, should be firmly based on three kinds of data, each representing an important part of the whole picture: (1) rigorous experimental research,<sup>4,22,23</sup> (2) clinical findings<sup>24,25,26</sup> and (3) anecdotal records of personal experience.<sup>27,28,29</sup> (Anecdotal and clinical data are at the leading edge, providing breakthroughs which are verified or clarified by systematic experimentation many years later.)

In my view, abundant data from these sources permit us to confidently describe the new “baby.” Different words could be used that are equally valid, of course – and I encourage you to find your own – but I would like to offer this simple statement incorporating what we now know about babies: *Babies, of whatever age, are aware, expressive, and affected by their interactions with us.* These traits are not mutually exclusive; they overlap and support each other. They imply an *early* sense of self,<sup>30</sup> which is a sharp departure from past theories which placed selfhood and mental activity “late in the second year.”<sup>31,32</sup> Such an idea is completely incompatible with the current literature on learning in utero and at birth.<sup>4,19,146</sup>

Awareness, expressiveness, and learning from interaction may not be “developmental” in the old sense because these behaviors can be noted across the whole range of development; we should probably accept them as normal aspects of human consciousness. Let me suggest, of only in sketchy form, how these qualities have been documented.

### 1. *Babies Are Aware*

Tactile sensitivity begins in the seventh week (m.a.) and steadily enlarges to include most parts of the body by 17 wks and *all* parts by 32 wks.<sup>14,21</sup> The sense of taste blossoms and functions around 14 wks<sup>33,34</sup> and taste buds seem to act like microprocessors.<sup>35</sup> Hearing may begin early in the first trimester<sup>36</sup> or as late as 18 wks<sup>37,38</sup> opening up a primary channel for learning and communication through most of pregnancy.<sup>39,40</sup> The vestibular system for orientation to space and gravity must be well advanced by 12 wks in order to play its part in the elaborate program of physical exercise which can be seen via ultrasound at that time.<sup>41</sup> By the time of birth, awareness has grown to include a keen sense of smell.<sup>42,43</sup> The fetus is aware of light even while the eyelids are still fused (i.e., from wk 10–26) and will react to lights flashed on the abdomen.<sup>44,45</sup>

In utero, vivid awareness is expressed in a range of emotional reactions: during parental intercourse,<sup>46,47</sup> erections while thumb-sucking,<sup>48</sup> cries in reaction to therapeutic abortion recorded as early as 21 wks,<sup>14</sup> kicking violently at loud concerts and frightening movies<sup>49</sup> and by “squalling in the womb” in reaction to obstetrical maneuvers close to the time of birth.<sup>50,51</sup> (This view of early emotion obviously differs from the view that emotions begin sometime after birth.)<sup>52</sup>

Also in utero, babies react to hot or cold infusions,<sup>45</sup> sweet or bitter tastes,<sup>45,53</sup> cease fetal breathing in reaction to vodka,<sup>54</sup> and languish in a noisy environment.<sup>55</sup> Out of the womb, but still premature, they notice and react differently to their bedding.<sup>56</sup>

Babies seem to know when they are unwanted. Longitudinal studies in Europe of children born to parents who were denied abortions illustrate how profoundly and consistently these children were damaged.<sup>57</sup> A recent longitudinal study in Sweden traces the ill effects of being the “wrong” sex.<sup>58</sup> Both of these are familiar themes in psychotherapy.

Awareness is required for the discriminative learning which takes place in utero, for example, the learning of music,<sup>59,60</sup> stories,<sup>40,61</sup> and language.<sup>36,39</sup> Beyond language and voice recognition, some infants demonstrate telepathic awareness of their mother’s thoughts and feelings.<sup>62,63</sup>

After birth, evidence of awareness is much easier to obtain and is abundant. Newborns are fully sensitive and sentient. A mature sense of smell joins the already developed faculties of taste and hearing.<sup>42,43</sup> In addition, new visual resources permit the newborn to focus on objects in close range, scan the environment day and night,<sup>64</sup> detect patterns, track movement, and see in color.<sup>65</sup> Babies have depth-perception,<sup>66,67</sup> reach out with intention,<sup>68,69</sup> and demonstrate visual recognition memory, a benchmark of intelligence.<sup>70,71</sup>

Discriminative awareness is seen in the rapid learning of mother’s face,<sup>72,73</sup> voice,<sup>40,61</sup> odors,<sup>74,75</sup> body contours,<sup>76</sup> and day/night cycles.<sup>77</sup> Similarly, newborns listen differentially to various cry sounds, favoring human cries of babies their own age.<sup>78,79</sup> Clear recognition of their own personal cries is evidence of self-awareness.<sup>80</sup>

## 2. *Babies Are Expressive*

People often complain that babies have no language and cannot participate in meaningful communication. This overlooks the fact that babies speak a number of "universal" languages about as well as we do.<sup>4</sup> These include especially body language in the form of movement, facial expressions, hand and finger signals, leg kicks, and a full range of vocal signals. Newborns are famous for their noises, screams, whimpers, whistles, whines, burps, coughs, sneezes, and grunts. You can also hear pleasurable coos, hums, sighs, and on rare occasions, a laugh. Movements and sounds carry information.

Modern ultrasound shows us how soon the fetus goes into action moving all parts of the body in a voluntary (not reactive), spontaneous (not stereotyped), and graceful (not reflexive) way.<sup>41,81</sup> This is a continuous form of body language with rolls, head-turning, waving, kicking, flexing the back, neck, and feet for up to seven minutes at a stretch. This self-initiated activity continues, with brief rest periods and as space permits, from the 12th week on through gestation.<sup>82</sup> Fingers (which will play such a big part in communication later) are busy playing with the mouth and umbilical cord.<sup>83</sup> Hand positions at birth are revealing, especially the clenched fist.<sup>84</sup>

By 26 wks the fetus has accomplished a ballet-like longitudinal roll;<sup>45</sup> this trick is added to somersaults and other kinesthetic activities learned in the aquatic environment. When it comes to kicking and squirming it may express a preference for the music that is playing,<sup>49,85,86</sup> resentment of a bright light aimed at the womb,<sup>44,45</sup> or be a perfectly friendly response to a "Kick Game" being encouraged by parents.<sup>87</sup>

Probably the first evidence of emotion can be seen in squinting and scowling around 12 wks (m.a.) and a sneerlike dissatisfaction at 14 wks.<sup>14</sup> After birth, of course, we have many more opportunities to observe facial expressions. Mothers and fathers have reported seeing these expressions: interest and joy (noted by 95%), anger (78%), distress (65%), surprise (68%), sadness and disgust (40%).<sup>88,89</sup> Emotion is another one of the baby's "universal" languages. Researchers have filmed babies going from pleasure to rage in 30 seconds.<sup>90</sup> Baby faces can instantly mimic adult emotional faces expressing sadness, happiness, and surprise.<sup>91,92</sup>

Another time to see a range of baby feelings is while they are asleep and dreaming.<sup>93</sup> Observers report seeing looks of perplexity, disdain, and fright along with writhing movements of the torso, limbs, and digits as if having bad dreams; they also see smiles and looks of mild amusement, as in pleasant dreams. Premature babies dream more than anybody else and show the most smiles in their dreams, along with frowns, writhing finger movements, neck stretches, mouth movements, and vocalizations.<sup>94</sup> We have learned from ultrasound that the beginning of REM/dreaming activity is at 23 weeks,<sup>95</sup> meaning that this form of creative expression continues for up to 17 weeks in utero. (Note that dreaming is creative cognitive activity generated at an unconscious level and probably incorporates elements of fetal experience to date.)

Baby faces tell us that their reactions to tastes and smells are about the same as ours.<sup>42,43,96</sup>

The expressions babies are most famous for are their cries, which begin much earlier than expected, in fact whenever air is available to the larynx.<sup>97</sup> As noted previously, audible distress cries have been recorded by at least 21 wks g.a.<sup>14</sup> and squalling in the womb itself, usually provoked by obstetrical maneuvers, can be heard before birth.<sup>50,51</sup> The range of cries uttered after birth reveal many things including fear, hunger, boredom, malnutrition, and a variety of drug-effects and diseases.<sup>98,99,100,101</sup> Pain cries are dramatic expressions of feeling.<sup>15,102,103</sup>

### 3. Babies Are Affected by Their Interactions with Us

One of the stubborn myths about babies is that they live in isolated splendor, preoccupied with themselves, and unaffected by experience. In the age of drugs, toxic materials and pollutants we have been forced to recognize that babies in the womb are suffering *physically* from their interactions with us but they are interacting emotionally and mentally as well.<sup>104</sup> And they learn from this.

#### (1) Prenatal Interactions

Remarkably, by 7 weeks, beta endorphins (a prime resource for dealing with environmental stress) are already in production.<sup>8</sup> The rapid development of the vestibular system enables the early fetus to balance and orient itself to the reality of gravity. The burst of physical movement which occurs by 12 weeks is a self-regulated interaction; moves are perfected over time.<sup>41</sup> After 14 wks, the fetus controls the frequency of swallowing amniotic fluid, a selective (perhaps preferential) process.<sup>53</sup> Later, the breathing of amniotic fluid is lowered or halted when alcohol or the toxins associated with cigarette smoking are detected in the blood stream.<sup>54</sup> These adjustments seem intelligent.

Prenates react to medical interventions with accelerated heart activity, turning, or moving away; if any air is available, they may protest from inside or outside the womb.<sup>50,51</sup> Reactions to amniocentesis are especially revealing: a burst of body movement when struck by the needle,<sup>105</sup> repeatedly striking the needle barrel after being hit (this with eye lids still fused),<sup>106</sup> loss of beat-to-beat variability in heart rate four minutes after puncture and lasting for two minutes,<sup>105</sup> babies motionless for two minutes,<sup>107</sup> breathing significantly slower for two days and in four days still not back to the previous breathing rate.<sup>108</sup> Psychiatric problems have been traced back to a needle hit during amniocentesis.<sup>1</sup>

Babies learn from other threatening encounters with us. Abortion attempts, not known by the children, led to annual (anniversary) suicide attempts by several teenagers at the same time of year the abortions had been attempted.<sup>109</sup> A baby born following sexual intercourse immediately developed a "pain complex" requiring psychiatric care.<sup>110</sup> Therapists are discovering more cases of the "vanishing twin," where psychological problems trace back to the experience of loss (consciously forgotten) of a twin in utero.<sup>111</sup>

In the womb, interactions are constant and relationships are everything. Babies and mothers eat, sleep, exercise, smoke, get sick, and take drugs *together* resulting in an intense rapport. If a mother is shot, yet unharmed, the baby may die.<sup>112</sup> If a psychotic husband goes on a rampage, the baby *and* pregnant mother end in distress.<sup>113</sup> Babies inside pregnant mothers going through an earthquake

in Southern Italy showed (via ultrasound) intense hyperkinesia which lasted 2–8 hours; their movements were numerous, disordered, and vigorous.<sup>114</sup> Mother's emotions of fright even from watching a video can upset babies measurably;<sup>115</sup> a mother's chronic depression may have long-term consequences for the baby after birth.<sup>116</sup> When babies are awaiting ultrasound for amniocentesis they are more active than when waiting for routine ultrasound.<sup>117</sup>

A three-year-old child having spontaneous recall of life in the womb, said he didn't like his mother singing "those low notes" in her folksongs.<sup>29</sup> He had protested the sound with increased activity but she misinterpreted his response and did it more!

Parents have taught their prenatals to play kicking games with them. One couple found their baby could learn to kick in a circle.<sup>87</sup> A Canadian father who said "Hoo, hoo!" next to the womb each night found his child pushing with a foot into his cheek on whichever side he called; this happened in the 25th wk of pregnancy.<sup>28</sup> Father and baby played this game for 15 weeks until the pregnancy ended; his next baby was able to learn this same game.

In formal experiments prenatals have demonstrated learning by classical conditioning.<sup>118,119</sup> More often, in experiments using the habituation paradigm prenatals show learning by distinguishing between novel and familiar stimuli.<sup>120,121,122</sup>

## (2) Newborns Are Interacting Too

Newborns are well-equipped for engagement with depth-perception,<sup>66</sup> coordination of eye and hand,<sup>69</sup> mouth and hand,<sup>123</sup> and sucking-grasping;<sup>124</sup> they have full tactile sensitivity, and the senses are coordinated and ready for interaction. They will retreat from bright lights, obnoxious odors, unpleasant tastes, and can detect the slightest differences in temperature of things touching the skin.<sup>125</sup> Babies interact by scanning the environment, tracking slowly moving objects, showing special interest in faces, and attempting to reach, contact, and grasp things of interest.

In a hostile environment, newborns will defend themselves: The opposite leg will come up to defend another being pricked by a pin,<sup>126</sup> arms are raised to strike and push away pressure on the chin.<sup>127</sup> Predictably, infants cry in response to needle pricks and electric shocks<sup>127,128</sup> and within one second will protest being pinched on the arm.<sup>129</sup> Heel lancing, which is a deeper wound, provokes facial expressions of hurt, anger, and shock, and an elevated heart rate.<sup>102,130</sup> When subjected to repeated lancing, newborns quickly learn to pull their foot away when someone tries to touch it.<sup>45</sup> If things get worse, newborns know how to retreat and calm themselves using sleep,<sup>131</sup> suckling,<sup>132</sup> and by going into a trance.<sup>133,134,135</sup>

Newborns have a strong attraction to people, faces, and voices, especially those of their parents. They are born already having learned their mother's voice and to an extent her 'mother tongue' both of which they seem to prefer.<sup>39,61</sup> It takes only a few minutes exposure for newborns to learn their mother's face.<sup>73,137,138</sup> Within minutes of birth, babies can recognize and imitate manual and facial gestures<sup>139</sup> and emotional expressions.<sup>91</sup> In just three days of



rooming-in newborns can learn the mother's sleep/wake cycle;<sup>77</sup> within two weeks can identify their mother's body contours in the dark<sup>76</sup> and in the first week will react sharply if she wears a mask and is silent while breastfeeding.<sup>72</sup> Babies are capable of rapt attention: fingers and toes aim right at the target, a behavior which can be seen in the 8-week embryo as well as the neonate.<sup>104,140</sup>

Out of the womb, infants continue to synchronize their own behavior with adult behavior, as can be seen when breastfeeding, when making contact by gaze and touch with parents;<sup>141</sup> while listening to human speech,<sup>142,143,144</sup> and in using lip movements to judge which voices and faces go together.<sup>145</sup> Synchronous behavior is a complex interactive skill requiring interest, keen perception, and self control.

Formal demonstrations of newborn learning and memory are abundant<sup>146,147</sup> including classical conditioning,<sup>148,149,150</sup> operant learning,<sup>151,152</sup> and habituation learning.<sup>153,154,155</sup> In addition, one can point to evidence of visual memory,<sup>71,156</sup> language memory<sup>157,158,159</sup> and procedural memory.<sup>160</sup> Babies born with a cord wrapped perilously around the neck often develop anxiety about wearing clothing or jewelry in that location; they usually don't know why, but their anxiety is an indelible mark of memory. A baby born at 29 wks and shunted for hydrocephalus without painkillers, learned from this experience to be phobic about medical procedures.<sup>161</sup> At the mere sight of a hospital he would tremble, scream, struggle and vomit; he was still reacting this way at age ten.

Finally, perhaps the most striking example of how babies learn from experience is how they remember their own birth. This display of cognition is conclusively validated by innocent children just learning to talk.<sup>4,27</sup> Their spontaneous memories are accurate, cogent, and intelligently critical of how things were done at birth; they demonstrate understanding of human relationships and character, precocious comprehension of language, and reveal that babies use altered states of consciousness much as we do. None of this was expected.

Perhaps for all the above reasons, experts around the world have begun to describe infants in new terms: they possess a "rational" mind,<sup>162</sup> are "socially attuned,"<sup>13,163</sup> "talented,"<sup>164</sup> "an extremely competent learning organism,"<sup>165</sup> "precocious,"<sup>166</sup> and "amazing."<sup>3</sup>

## **Conclusions and Recommendations**

1. The truth about infants is not told by their size, age, and motor abilities; these factors have actually obscured their real complexity and sophistication. Because their true identity is revealed by awareness and expressiveness, let us speak of sentience rather than age and physical handicaps.
2. In medicine and psychology, preoccupation with the size and function of the brain has postponed discovery of infant capabilities for a hundred years. False ideas about the brain are still the principal justification for cruel and abusive treatment. In the future, let us speak of their intelligence, rather than their brains.
3. Because babies, like other humans, are always sensitive and have personal preferences and feelings, we should no longer condone or routinize their

pain. Let us speak of feelings, not “reflexes” and make it a goal to eliminate *medically-caused* pain from birth.

4. Because infants of all ages manifest intelligence and are learning from their experiences with us, providers of *physical* care should always consider the effect of a procedure on the baby’s emotions and mind. Let us think *mind*, not just body.
5. In closing, infants are much more than we thought. Nineteenth century science was materialistic in viewing the baby as body, brain, and reflex material. The 21st century view of babies will, I believe, focus on their sensations, emotions, sense of self, personality, communication ability, mind, and consciousness. This major paradigm shift is urgently needed.

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