Kathryn uses the energy in S-twist and Z-twist singles to create a playful and lively surface in her knitted garments.

Knitting with Singles

Creating surface design with energy and twist

BY KATHRYN ALEXANDER

WHEN I FIRST LEARNED to spin, I happily followed the guidelines that my peers and teachers had set for me. It was wonderful! I was knitting and weaving with yarn that I had made for myself. However, I had problems with my yarn that even veteran spinning friends couldn't explain. For the most part, I had problems with my singles yarns, but problems also showed up, from time to time, in my plied yarns. The sweaters I made with these problem yarns were slanted! I didn't mind too much because I found it so exciting that I could make garments from scratch (I was new to knitting and weaving as well). However, this euphoria ended when I made a baby cardigan as a gift for a friend. The buttons that were supposed to be centered in a vertical line up the front went, instead, from the baby's left hip to her right shoulder!

Over the years, with the help of many friends and teachers, I began to understand what caused the bias in my knitting. With my curiosity pushing me along and with my skills and confidence growing, I was able to answer many of my early questions. Eventually, I began to see spinning as the process of introducing varying amounts of twist, or *energy,* into a yarn. I also started to think about how this energy could be controlled and directed. Instead of countering the energy and making balanced yarns, I began to use the design potential of working with singles that are full of energy.

In this article, I'll use the terms energy and twist. While the concepts of energy and twist are related, I see them as quite separate—energy refers to the rebound capacity of the spun yarn, while twist has to do with the structure of fibers being wound around each other in the spun yarn. A yarn can have a lot of twist without a lot of energy and vice versa. For example, a plied yarn can have a lot of twists per inch, but because the energy is balanced through plying, the yarn doesn't have the active energy to tilt knit stitches. A low twist singles yarn will have energy enough to tilt stitches in knitting simply because it is a singles yarn—the twist goes only in one direction without a plied yarn to balance the energy created by twisting the fibers. A yarn that has been steamed will lose the active energy to tilt, though the twist remains in the yarn.

Kathryn's gauzy sweater illustrates the diverse textures that can be created with fine singles in a machine-knitted fabric.

Now I call them energized yarns, and I see exciting possibilities in the patterns that occur when I knit with them.

Using the inherent energy of singles yarns, many colors, and a variety of knit stitches as creative tools, Kathryn creates awe-inspiring artistic garments. Kathryn used the soft, short staples of Columbia lambs wool from her brother's flock in Montana to spin the singles yarn for this sweater.

Simply put, I use yarns in which the excess energy has not been removed through any of the typical finishing techniques such as washing or steaming. Since I see this excess energy as a friend and not a foe, it seems negative and unfair to describe these lively active yarns as unbalanced and overspun. Now I call them energized yarns, and I see exciting possibilities in the patterns that occur when I knit with them.

As I began to explore the design potential of these energized singles, I found that I really liked the way excess energy in yarn forces a knit stitch onto its side. This texture stays in the cloth even after washing. All the combinations of the S-twist and Z-twist yarns that I use in stockinette stitch exhibit their own unique surface.

Because I was interested in creating patterns using the tilted stitches, I learned quickly that knitting samples of the energized yarns was essential to learning what effects I would get. I'll explain some of the special aspects of spinning and knitting energized yarns, then I'll share some of the samples and experiments that helped me see their fantastic possibilities.

Spinning the yarn

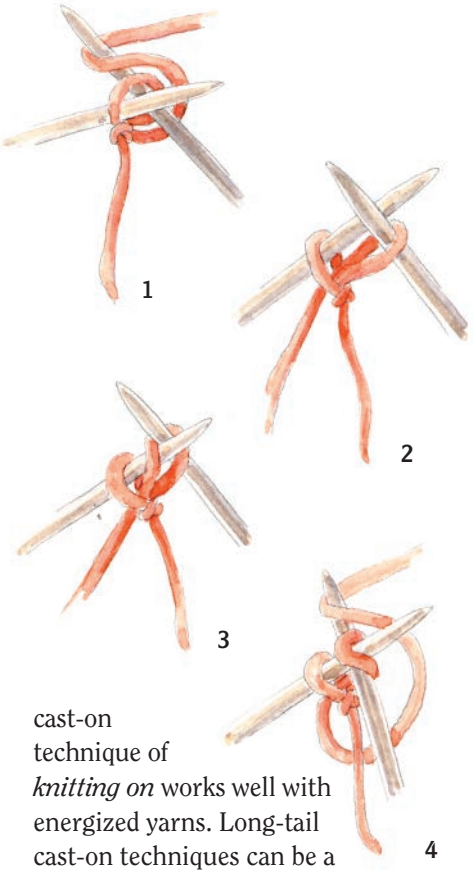
When I began this type of spinning, I found that I had more control when spinning Z-twist yarn. So, when I needed both Z-twist and S-twist yarns, I spun the S-twist first and used it as a guide to compare size and twist while spinning the Z-twist. You may also find, when you spin singles in the different direction than you are used to, that the action of the twist coming into the drafting zone has a different feel—even the action of your wheel may feel a bit different.

The angle of the twist in a singles yarn that has been plied back on itself equals the angle of the tilt in the knitted cloth. Needle size also affects the stitch tilt—if the stitches are too loose, the active yarn will twist back on itself; if the stitches are too tight, there isn't room for the twist to play out within the fabric and it will be forced to the edges of the cloth.

Different fibers produce different angles of stitch tilts. For example, a soft Merino wool relaxes a little after finishing so there is less tilting in the final fabric and the surface is not as three-dimensional as in a fabric made with longer and coarser fibers.

Casting on with energized yarn

For me it is easier to cast on with Z-twist yarn than S-twist yarn. The

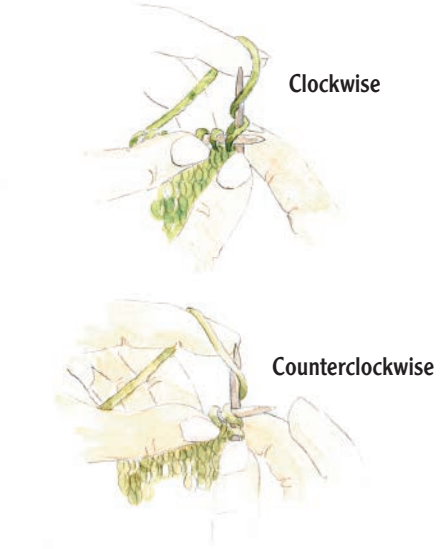


cast-on technique of *knitting on* works well with energized yarns. Long-tail cast-on techniques can be a challenge because you must secure the tail yarn so that the energy does not escape.

After you cast on and as you knit, weave in all ends right away or the energized yarns will untwist and disintegrate.

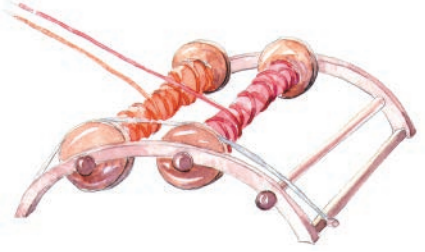
Wrapping the yarn around the needle

The wrapping and looping that occurs during the knitting process seems to add to or subtract from the amount of twist in the knitting yarn. For many knitters, when the yarn is wrapped around the needle to make a knit or a purl stitch,



the yarn comes around the needle counterclockwise. Throwing the yarn counterclockwise removes energy from Z-twist yarn but adds energy to S-twist yarn.

To create an even stitch-tilt pattern in the knitted fabric, all the yarns should have an equal amount of energy. If wrapping the yarn around the needle changes the amount of twist in the yarn, then the process of knitting can affect the amount of twist in the yarn and the even appearance of the finished knitted fabric. I found that I needed to remove energy by removing some twist as I knit with both yarns. This meant that when I knit with Z-twist yarn I make the stitches in my usual way. But when I knit with S-twist yarn, I need to wrap the yarn around the needle clockwise, rather than counterclockwise. This means that I wrap the yarn around



Kathryn held a S-twist and Z-twist silk/linen yarn together as she knit this sweater—rather than balancing each other like a plied yarn, the energy in these yarns pushes against each other to create the lively texture in the sweater.

the needle in the opposite direction than I usually do. When I turn the work to begin knitting a new row, these stitches are sitting backward on the needle. So I knit in the back of each stitch to correct its position on the needle.

This technique of wrapping the yarn around the needle in a new direction can be worked whether you throw your yarn with your right hand or your left hand. It just takes a little time and practice to adjust.

Working off the bobbin

Consider knitting directly from the bobbin. Keep in mind, though, that if the yarn is removed by pulling it from the end of the bobbin, it comes off either in a clockwise or counterclockwise direction depending which end you unload from. This feature will add or subtract energy from the yarn depending on what direction the yarn was spun. You can avoid adding or subtracting energy by unloading the bobbins from their sides. I use a Lendrum lazy kate—the bobbins sit vertically and the yarn is pulled off from the side through an eye on the lazy kate.

I always place the Z-twist yarn at my right side and the S-twist yarn on my left so that I know which is Z-twist and which is S-twist. Also, as I am knitting with both yarns, I carry the Z-twist yarn above the S-twist; doing so helps me tell the yarns apart as I'm knitting. Avoid the urge to pull off more yarn then you need as you are knitting. I adjust the tension on the lazy kate so it acts as my knitting tension. As I knit with this method, the yarns do not ply back on themselves and become snarled. Thus the energy does not get trapped behind the plied or snarled areas that might cause the amount of energy in the knitted cloth to be uneven. If your knitting style includes wrapping the yarn around your hand or finger several times to obtain an even tension, open your hand every few inches to let the energy migrate toward your needle. Consider that wrapping the yarn around your fingers shuts the door to the path the energy can travel.

Choosing knitting needles

I learned that needle size plays an important role in creating an intriguing knitted surface with energized yarns and can greatly enhance or diminish the bias effect of the fabric as a whole. Longer stitches created on larger needles have more room for the energy in the yarn to move. However, this only works up to the point where the yarn within the stitch becomes so long that it plies back on itself and makes a little snarl **(Sample 3c)**. A smaller needle

Kathryn knits directly from her lazy kates, one on each side of her—the S-twist always on her left, the Z-twist always on her right.

creates a shorter stitch that provides less room for the energy to move.

How much energy?

Working with these energized yarns in my studio in Berkeley, California, in 1992, I decided to test a theory I had. I believed that depending on the size needles I used, the angle of twist in the yarn when it plied back on itself in a relaxed state would probably be the angle of stitch-tilt definition I would get in the knitted cloth. I began by spinning two yarns from a medium grade carded wool, one S-twist and the other Z-twist. I knitted a stockinette stitch swatch on U.S. size 3 needles. I found that the stitch tilt in the knit sample **did** match the angle of twist in the plied yarn **(Sample 1)**.

A gallery of samples

Sample 4a: Ribbing samples show how purl stitches are affected by the energy in singles yarn. Same yarn as in sample 3, knitted with U.S. size 5 needles. *All rows:* K3, p3 with Z-twist yarn. Notice how the ribbing does not close in as it would with a plied yarn. The purl stitches bias in the S-twist direction.

Sample 4b: *Rows 1–6:* K4, p4 with S-twist yarn. *Rows 7–12:* K4, p4 with Z-twist yarn. See page 65 for abbreviations key.

Sample 4b. The first thing I tried was stockinette stitch. I knitted six rows with S-twist and six rows with Z-twist. The result was a nice herringbone effect; the cloth will stay on grain if the rows of S- and Z-twist are the same height. If I were to use this pattern in a garment, I would use the rows of surface design in a vertical format so I could incorporate the great points, which occur when I change S-twist and Z-twist yarns.

Sample 5a. In this sample, I knitted the entrelac three-dimensional peaks with the Z-twist yarn. The first set of peaks pointed out but spiraled in the direction the yarn was spun. The second set of peaks did something totally different—the peak flattened out and turned into a spiral. I repeated this same sample using the S-twist yarn and the two rows of peaks traded places. This made me see that the diagonal of the entrelac pattern of the rectangle directly affected how the Z- and S-twist yarns could react. Working this pattern with only one energized yarn results in a surface of alternating rows of peaks and spirals **(Sample 5a)**. If you want to create a surface of either all peaks or all spirals, try using both the S- and the Z-twist yarn. For a surface of peaks **(Sample 5c)**, the first sequence of rows needs to be worked with the Z-twist yarn, the second with the S-twist. To get a surface of swirls **(Sample 5b),** try the opposite.

Sample 6a. The idea for this sample came from a weaving experience. I had been working with Peggy Osterkamp on some collapse weave structures. When she measured the warp for one of her samples, the very fine, highly energized S- and Z-twist yarns stuck together. Instead of trying to separate them, she threaded them through the same heddle and dent. When she wove using a plain-weave pattern, the cloth had a great texture that almost appeared knitted. My first thought was that this way of working with two threads would transfer to knitting. I hoped the effect would be as dramatic in the knitted cloth as it was in the woven. I used alpaca wool for this sample because I love so many of its

Sample 1: In a medium dense cloth, the angle of twist in the singles yarn when it is plied back on itself equals the amount of tilt in the stitch and the angle of bias in a stockinette sample. Both this swatch and Sample 2 were made with medium grade wool, spun with about 6 twists per inch, and knitted on U.S. size 3 needles.

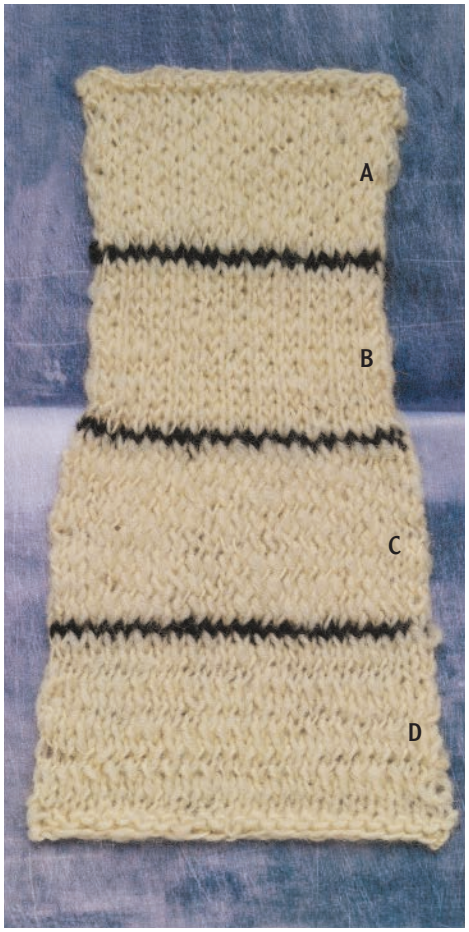
qualities—the silky softness, sheen, and ability to drape **(Samples 6a and b)**. I decided to make the yarn very fine but knitted with U.S. size 8 needles to make a sweater that would be light and lively without lots of large open space across the surface (See page 58).

Because the woven sample was plain weave, I decided that the knitted sample should be uncomplicated so I used the garter stitch. I spun two very fine yarns; one was S-twist spun with less energy than the Z-twist yarn. To knit the sample, I held the two yarns together as I worked the garter-stitch pattern. The opposing energy in the yarns makes them repel each other in the cloth. This opposing energy makes the cloth look nothing like traditional garter stitch, rather it looks like chain mail or double knitted cloth. If the yarn is fine, has enough twist, and the needles are large enough to give the energy room to roam, no rib-like rows typical of garter stitch will be evident in the cloth. The sample was everything I wanted it to be—lightweight and amazingly lively, with a permanent bounce-back drape. I was thrilled to be able to alter the garter stitch surface in such a beautiful way by simply incorporating energy into the design.

Changing direction

Once I discovered the possibilities of working with energized yarn, it took over my life. I think about pushing the envelope of spinning and knitting constantly—I dream about it, and sometimes I find myself thinking about the exciting conclusion on something I have been working on while I am actually holding a conversation with someone! Even the way I paint the rooms of my house reflects the way I think about my work. I see everyday things in a new light now, and I have found that the way I cook is influenced by how I spin, knit, dye, and weave. I start new projects with enthusiasm, because I know they will be fun and wonderful. The love of the craft propels me forward and makes every day exciting. Energized yarns provide an endlessly useful and fascinating way to create—they keep me excited and curious about my work.

KATHRYN ALEXANDER *of Johnsonville, New York, is a spinner, knitter, and weaver. She uses her own hand-dyed, handspun yarns to make her colorful designs—taking traditional techniques in new directions.*

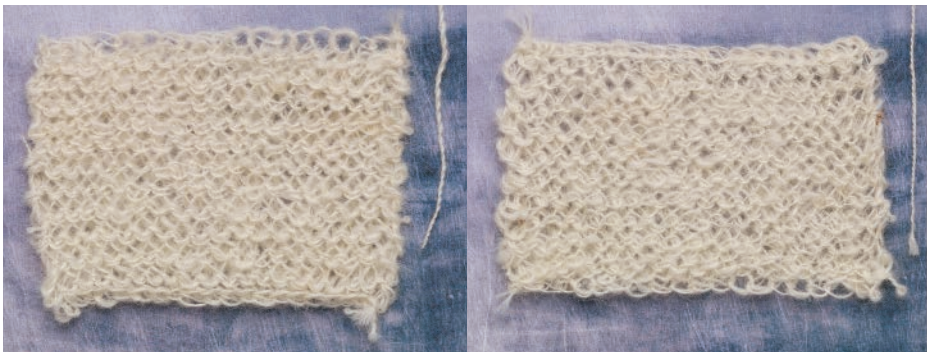


Sample 2: Alternating S-twist and Z-twist yarns in a stockinette swatch. A) ***Row 1:*** K1 S-twist, k1 Z-twist. ***Row 2:*** K1 Z-twist, k1 S-twist. B) ***All rows:*** K1 S-twist, k1 Z-twist. C) ***Row 1:*** K S-twist. ***Row 2:*** K Z-twist. D) ***Rows 1 and 2:*** K S-twist. ***Rows 3 and 4:*** K Z-twist.

Sample 3: The effects of gauge on stockinette samples using S-twist and Z-twist singles yarn. Medium grade wool spun at 18 wraps per inch with 6 twists per inch. A) Knitted on U.S. size 3 needles. ***Row 1:*** K1 S-twist, k1 Z-twist. ***Row 2:*** K1 Z-twist, k1 S-twist. B) Same pattern, but using U.S. size 5 needles. C) Same pattern, but using U.S. size 8 needles. Note how the stitch tilt is not as visible with this sample as with the others—that is because the energy in the S-twist and Z-twist yarns balance each other out with the longer stitches.

Sample 6a: This alpaca yarn singles is spun very fine (26 wraps per inch). In this sample Kathryn held both S-twist and Z-twist singles together as she knitted the garter-stitch sample using U.S. size 3 needles. She spun the S-twist yarn with less energy than the Z-twist yarn to insure that both yarns would have an equal amount of energy when thrown around the needle.

Sample 6b: For this sample Kathryn spun a fine alpaca yarn like Sample 6a. She knitted the garter-stitch sample using U.S. size 10 needles.



Making Entrelac Triangles and Peaks

Sample 5a: Entrelac peaks and swirls with energized yarns. Same yarn as samples 1 and 2, using U.S. size 3 needles and Z-twist yarn. Cast on 24 stitches. Knit 2 rows. Make four 6-stitch triangles. Make three sets of peaks. Knit 1 row, bind off in garter stitch.

Sample 5b: Cast on 24 stitches using U.S. size 3 needles and Z-twist yarn. Knit 2 rows. Make four 6-stitch triangles. Make one set of peaks. Change to S-twist yarn to make the second row of peaks. Alternate these two rows of peaks using S-twist and Z-twist singles. Fill in the spaces between peaks with ending triangles. Knit one row, bind off in garter stitch.

Sample 5c: Cast on 24 stitches with U.S. size 3 needles and Z-twist yarn. Knit 2 rows. Make four 6-stitch triangles. Switch to S-twist singles. Make one set of peaks. Change to Z-twist singles to make the second row of peaks. Alternate these two rows of peaks using S-twist and Z-twist singles for two more sets. Fill in the spaces between peaks with the ending triangles. Knit one row and bind off with garter stitch.

Triangles[1]

Row 1 will be the right side. Each triangle is worked back and forth on 6 sts.

Row 1: K2, turn. *Row 2:* Sl 1 purlwise, p1, turn. *Row 3:* K3, turn. *Row 4:* Sl 1 purlwise, p2, turn. *Row 5:* K4, turn. *Row 6:* Sl 1 purlwise, p3, turn. *Row 7:* K5, turn. *Row 8:* Sl 1 purlwise, p4, turn. *Row 9:* K6. Repeat these 9 rows until four 6-stitch triangles have been worked.

Set of Peaks

Made by working three sets of peaks; start with the wrong side facing.

Edge triangle: A single triangle must be worked to keep the edge of the panel straight. *Row 1:* P2, turn. *Row 2:* Sl 1 purlwise, k1, turn. *Row 3:* P3, turn. *Row 4:* Sl 1 purlwise, k2, turn. *Row 5:* P4, turn. *Row 6:* Sl 1 purlwise, k3, turn. *Row 7:* P5, turn. *Row 8:* Sl 1 purlwise, k4, turn. *Row 9:* P6.

Now you are in position to work the first set of four 6-stitch rectangles over the remaining stitches. **First set of rectangles:** With the right side facing, **pick up and purl 6 sts along the left side of the first foundation triangle, beginning at the top of the triangle and working down to the base, from right to left. Slip the 6th picked-up st to the left hand needle and purl it together with the first st from the next 6-st group. Work the 6-stitch rectangle as follows. *Rows 1, 3, 5, 7:* K6, turn. *Rows 2, 4, 6:* P5, p2tog (one of them will be from the next group of sts), turn. Repeat from ** three more times.

Ending triangles

With the right side of the work facing, pick up 5 sts knitwise starting from the tip of the rectangle, k1 from lefthand needle. *Row 1:* Sl 1 purlwise, p1. *Row 2:* Sl 1 knitwise, k2. *Row 3:* Sl 1 purlwise, p3. *Row 4:* Sl 1 knitwise, k4. *Row 5:* Sl 1 purlwise, p5, p2 tog. *Row 6:* Sl 1 knitwise, k6, sl 1, k2tog, psso.

Continue in this manner until all spaces between the peaks have been filled in with 6-stitch triangles.

[1] These directions were originally published in Kathryn Alexander's article, "Entrelac Hat," in the Fall 1996 issue of *Interweave Knits*, page 50.